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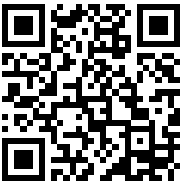

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Proceedings

OF THE

LOUISIANA

Society of Naturalists.

1897-1899.

NEW ORLEANS, LA.
Printed for the Society.
1900.

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Additions and Corrections.

Page 5, line 2 from bottom—*strike out* comma *after* "treatises."
Page 6, line 4—*for* Schleider *read* Schleiden.
Page 17, Note—*for* **fluviatilis** *read* **pluviatilis.**
After **XXI**, *add* **1900, p. 91, pl. VI., fig 6.**
Page 28, line 36—*for* for *read* far.
Page 29, line 30—*for* oft he *read* of the.
line 32—*for* Ratler *read* Rattler.
Page 37, head of page—*insert* Order RANIFORMIA.
line 17—*for* Thls *read* This.
Page 51, line 29 -*for* **Cavarici** *read* **Clavarici.**
Page 63, line 1--*after* for *insert* as.
Page 83, line 5--*for* "*Oedimia*" *read* "*Oidemia.*"
Page 105, line 29--*for* **Icturus** *read* **Icterus.**
Page 125, line 8--*for* Riddle *read* Riddell.
line 4 from bottom--*for* Orleaus *read* Orleans.
Page 134, line 7--*for* movemeuts *read* movements.

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THE LOUISIANA SOCIETY OF NATURALISTS.

Organized 3 July, 1897—Incorporated 1 May, 1899.

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MR. R. S. COCKS, M. A.

EDITOR.

MR. E. FOSTER.

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PROCEEDINGS

OF THE

Louisiana Society of Naturalists.

SESSION 1897-1898.

EXTRACTS FROM THE MINUTES.

MEETING of DECEMBER 17, 1897, held at the Tulane University—President Dillard in the chair.

Prof. G. E. Beyer contributed a paper on "The Herpetology of Louisiana," together with a check-list of the batrachians and reptiles found within the limits of the State. (See Appendix, I).

Prof. H. A. Morgan read a short paper on the egg-parasites of the Harlequin Bug (*Murgantia histrionica*), giving in detail the results of experiments with *Trissolcus murgantiæ* and *T. podisi* as active agents for the eradication of the pest. Partial details of such experiments had already appeared in Bulletin No. 48 of the Louisiana State Experiment Station, a number of copies of which were furnished by Prof. Morgan for the use of the members. The paper was followed by a short talk on mimicry in insects, illustrated by photographs and drawings.

The Secretary-Treasurer read a short communication from Prof. W. R. Dodson in regard to an abnormal growth of a potato plant, in which the so-called tuber was above ground,

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proving the contention of botanists that the tuber is really a stem. The communication was accompanied by a photograph of the plant.

MEETING OF JANUARY 14, 1898, held at the Louisiana State University and Agricultural and Mechanical College, Baton Rouge —President Dillard in the chair.

Prof. Brown Ayres presented the following resolution in regard to the appointment of officials in the United States Fish and Fisheries Commission:

"THAT, WHEREAS at a recent session of the American So-
" ciety of Naturalists, held at Ithaca, N. Y., it was the unan-
" imous expression of the members assembled that the Com-
" missioner of Fish and Fisheries of the United States should
" (according to the law of 1888, governing his appointment)
" be a person of proved scientific and practical acquaintance
" with the fish and fisheries of the coast, and that it is of
" the utmost importance that the Fish Commission, as one of
" the most useful scientific institutions of the government,
" should be free from political influence, and should be ad-
" ministered with the highest degree of efficiency by an expe-
" rienced officer.

"AND WHEREAS, that while the objects of the Louisiana
" Society of Naturalists are entirely outside the pale of poli-
" tics, yet those objects do not preclude the Society taking an
" interest in all that pertains to the economic as well as the
" scientific aspects of the case in question.

"RESOLVED, That the cordial support of this Society be
" given to the contention of the American Society of Natu-
" ralists, calling on the President and Congress of the United
" States to use due diligence in the exercise of their prerog-
" ative."

The resolution was unanimously adopted.

Prof. H. A. Morgan then addressed the meeting on "Some Recent Observations upon the Cattle Tick [*Boophilus bovis*]."*

In introducing his subject Prof. Morgan pointed out that the tick was not an indigene of the South, but a native of Africa, whence it had made its way to Spain, and from Spain to South America, Mexico and the Gulf States, and that it was only within the last decade it had been surmised there

*For further particulars in regard to the line of investigations see Bull. 51, 2d Ser., State Experiment Station, Baton Rouge, 1898.—Ed.

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was any connection between the arachnid and the "Texas fever." Recent investigations had, however, revealed the fact that the tick was the chief, if not the only conveyor of the fever germ. Once this discovery had been made, remedial measures had been searched for. Prophylactic treatment had been suggested, but the result had not been encouraging. The references to the literature on the subject, given by Prof. Morgan, furnished ample proof of the great interest which had been aroused since the connection of the tick with the bovine fever had been established.

The life history of the tick, as worked out by Prof. Morgan and other investigators, was then given in detail. The various stages in its development were also fully described, the result of the investigations going to prove that the life cycle is completed in about forty days; that the female produced about 3,000 eggs, which hatched out in from fifteen to twenty days, producing the well-known seed ticks. These seed ticks, in time, attached themselves to the first animal passing. Their growth at this stage was rapid, in a few days molting taking place, and the once hexapodous seed tick becoming an eight-legged form. During this stage no difference in the sexes could be detected until after the second molt, when the characteristic features were discernible, the female, however, taking five or six more days than the male to fully develop.

With this life cycle as a basis, experiments were made to determine the best possible conditions of development, and vice versa, in the belief that with a complete knowledge of such, some simple farm operation could be devised which would bring about environments destructive to the tick.

The following lines of investigation were then discussed: [1] Influences of rainfall upon development; [2] influence of drought; [3] influence of frost; [4] absence of food, and [5] the action of heat and direct sunlight. The results proved that rainfall in no way retarded incubation, but that direct sunlight was destructive to the fertility of the eggs. Cold weather retarded incubation to such an extent that eggs deposited during October might not hatch until the following spring. The absence of moisture was proved to be fatal to the seed tick, and it had been found that few survived a temperature of 15 degrees, the latter fact suggesting that if any attempt be made to eradicate the pest, success would be more certain after cold winters. The habit of the

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young ticks of falling to the ground on the approach of cold weather might be made use of by the stock-raiser, the burning of the pastures being recommended. Dipping the stock in vats containing water on which floated black machine or mineral oil, which was first recommended by Dr. Francis, would, in the opinion of Prof. Morgan, mean the extermination of the tick, and, of course, the concomitant fever.

Prof. Beyer contributed a short paper on "The Cranial Development of the Genus Elaps," in which he drew attention to the deceptive contour of the head of the Harlequin Snake as compared with its osseous structure. Comparison was also drawn between its anatomy and that of the rattlesnake, and reference made to the gentle disposition of the species as furnishing grounds for the belief that the snake is harmless.

Mr. J. C. Smith contributed a paper on the protozoa in general, accompanied by descriptions of two new species [*Lembus ornata* and *Tillina megastoma*]* discovered by him in the brackish waters of Lake Borgne, with particulars in regard to their manner of reproduction and taking food. The paper was illustrated by drawings of the new species.

MEETING OF FEBRUARY 25, 1898, held in the rooms of the New Orleans Parish Medical Society—President Dillard in the chair.

The Rev. A. B. Langlois contributed a paper on "The Greater Agarics, with Special Reference to their Poisonous and Non-poisonous Qualities." [See Appendix, II].

Mr. E. Foster read a brief report upon a collection of hymenoptera made on the banks of the Mississippi near Audubon Park. [See Appendix, III].

MEETING OF MARCH 11, 1898. held in the rooms of the New Orleans Parish Medical Society—President Dillard in the chair.

The Secretary-Treasurer read a communication from Prof. Taylor, of Ruston, advocating that the members of the Society organize for the purpose of making a natural history survey of the State, the object of such survey to be: [1] The collecting of material, the carrying on of investigations and the securing of uniformity in publications; [2] the workers to

*For technical description of these two new forms, see Trans. Am. Micr. Soc., Vol. XX, 1898, pp. 53 and 54, pl. 11, figg. 4 and 6.—Ed.

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consist of a director and head for each branch or sub-division, and [3] the result of each year's work to be published in book-form. Prof. Taylor offered the printing department of the State Industrial Institute for such purpose of publication.

The communication was discussed, and the sense of the meeting seemed to be that the Society, with its present membership, was not, as yet, in a position to branch out. The matter was finally left to the Executive Committee.

Prof. W. R. Dodson contributed an exhaustive paper on "The Micro-organisms of the Soil," introducing his subject by a comprehensive description of the Schizomycetes, and giving in detail their general character, manner of reproduction, the power of locomotion possessed by certain species and their dimensions.

For convenience Prof. Dodson divided the bacteria into three groups: [1] Those that take their food from inorganic sources; [2] those that live on decomposing vegetable or animal matter, or upon both organic and inorganic material, and [3] those that may live parasitically upon the roots of plants. These three groups were treated in detail, and their influence on the soil, and their many uses to the agriculturist fully discussed, Prof. Dodson instancing the immense numbers of these minute organisms to be found in all soils by the fact that one pound of soil taken from the botanical garden at Baton Rouge contained no less than 112,000,009 bacteria.

After some discussion, in which most of the members present took part, a number of highly interesting slides of the various organisms referred to in the paper were exhibited, microscopes being furnished by Messrs. Joachim, Dodson, Smith, Richards and Foster.

MEETING OF MARCH 25, 1898, held in the rooms of the New Orleans Parish Medical Society—President Dillard in the chair.

Mr. J. C. Smith contributed a paper, "An Introduction to the Study of the Fresh-water Protozoa," which was primarily intended for those members who had little acquaintance with the subject, and as the basis of more technical work at a future date.

In the course of the paper, Mr. Smith sketched the history of the study of the protozoa from the earliest work of Leewenhoek, in 1677, down to the latest exhaustive treatises, of Saville Kent and Buetschli, laying special stress on the

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services rendered to students of American forms through the labors of Prof. Clark, Prof. Leidy and Dr. A. C. Stokes. The unicellular theory, was also explained, and its history from its promulgation, in 1838, by Schwann and Schleider, down to the latest ideas of Haeckel, Huxley, Lankester and other notable biologists, given in detail.

The general structure, habits, manner of taking food and mode of reproduction were lucidly treated, each step in the paper being amply illustrated by black-board drawings.

After briefly touching on the latest systems of classification, Mr. Smith, by means of well-executed drawings, illustrated many of the more common forms to be found in the ponds and ditches in the vicinity of New Orleans.

The paper was followed by a microscopical séance, at which Messrs. Smith, Joachim, Richards, Cocks, Beyer, Harris and Foster assisted.

ANNUAL MEETING OF MAY 27, 1898, held at Tulane University.

President Dillard, reviewing the work of the Society during the session, said:

"In all places where a number of students, though the number may be small, are doing real work in the various branches of some subject, such for example as Natural History, it is fitting that they should come together both for mutual helpfulness and for the extension of knowledge and interest among others. In Louisiana, because of the richness of the field of observation and the comparatively small amount of work hitherto accomplished in investigating the wealth of material, it was especially fitting that this Society of Naturalists should be formed.

"Its formation was due to the initiative of the present Secretary-Trsasurer, at whose call a meeting was held in the Howard Library, and the Society partially organized on July 22, 1897. At a subsequent meeting, held soon after in the same place, the organization was completed, and the arrangement of a programme of work was entrusted to the executive committee. After several meetings of this committee it was determined to hold eight meetings of the Society during the session, on the last Friday of the months, beginning with October and ending with May, the last to be the annual meeting. The committee was also able to arrange in advance for

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the seven necessary papers, a fact which proved at once the need for the Society and the activity of a band of workers.

"The presence of yellow fever in the fall disarranged the proposed programme, and prevented the opening of the session until December 17. At the meeting of the Society held on this date in Tulane University, Prof. Beyer read a paper on "The Herpetology of Louisiana." This lecture was the first systematic contribution to the knowledge of the reptiles of the State. One hundred and thirteen species were enumerated as found up to date, and the lines of demarkation were ably presented. The check-list given is probably the first attempt to treat exhaustively any of the many orders in the science of Natural History so abundantly represented in Louisiana. At this meeting Prof. Morgan, of the State University, also read a very interesting communication in the nature of notes on the Harlequin Bug.

"The second meeting of the Society was held in Baton Rouge, and I trust it will not be thought amiss if I take this opportunity of expressing the appreciation of the eight members who attended the meeting from New Orleans for the hospitality and courtesy shown by our fellow-members in Baton Rouge, and by the President and entire faculty of the University. The paper was read by Prof. H. H. Morgan, the State Entomologist, who gave an exhaustive account of a series of experiments inaugurated for the purpose of establishing the connection between the so-called Cattle Tick and the Texas Bovine Fever. The lecture has since been printed in Bulletin No. 51 of the Louisiana State Experiment Station. Brief papers were also read by Prof. Beyer and Mr. J. C. Smith. The former communicated some notes on "The Cranial Formation of the Genus *Elaps*," which embraces the well-known Harlequin snake of Louisiana. The paper, though brief, was a valuable contribution of original research. Mr. Smith's paper dealt in a most interesting way with two forms of infusorial life, new to science, which he had found in the brackish waters of Lake Borgne. At this meeting the Society passed a resolution supporting the American Society of Naturalists in the matter of the appointment of the National Commissioner of Fish and Fisheries. The effort was to have the appointment made regardless of party politics and regardful of the immense economic interests involved. Every consideration, save that of mistaken party politics, pointed to the need of a commissioner who should be an experienced scientist. The protests of scientific bodies proved, however,

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of no avail, and this great department of the government must for a time be administered by an appointee without scientific attainments.

"At the third meeting of the Society, held in February in the rooms of the New Orleans Parish Medical Society, the Rev. A. B. Langlois, of St. Martinsville, read a paper of much original research on "The Greater Agarics." The reputation of this distinguished botanist, whose accurate work is recognized throughout the country, is sufficient warranty that his lecture was one of great value and learning.

"The lecture of Prof. W. R. Dodson, at the fourth meeting of the Society, treated of "The Micro-organisms of the Soil." The subject was presented in a most interesting style, which made plain, even to laymen in science, the valuable results of original research covering months of steady observation.

"No lecture of the Society's first year was more interesting and instructive to the members and guests, who had the pleasure of being in attendance, than that of Mr. J. C. Smith on the "Protozoa." The treatment of the subject was in the nature of an introduction to the study of these microscopical forms of life, serving as a preliminary paper to further contributions, which will, we are sure, not only prove interesting to members, but be valuable contributions to science. Mr. Smith's long study of the infusorial life found in southern Louisiana, ranks him as an authority in this line of research, and his contributions will form an important part of the work of this Society.

"Both the fourth and fifth meetings were held during March in the rooms of the Medical Society. It was expected that a meeting would be held in April, when a paper was to be read by Prof. W. E. Taylor, of Ruston, but he was unable to be present.

"The above list of excellent papers gives evidence of a most creditable first year's work. I should not fail to make mention also of the full and accurate minutes of the meetings which have been made by the secretary. The Society is particularly fortunate in enjoying the services in this office of one who possesses such intelligent information in the various branches of the science of Natural History.

"In regard to printing the proceedings of the Society I would earnestly recommend that a committee of three be appointed, with the Secretary as chairman, which shall have

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charge of the publication, and that the proceedings shall be issued, printed in good style, as soon as the funds of the Society shall be found to justify the expense.

"The Secretary-Treasurer's report will show the financial condition of the Society. It is hoped that when all dues have been paid the surplus will be sufficient for the proposed publication.

"We have received a number of valuable pamphlets from the various departments at Washington, from the Smithsonian Institute, from Prof. Beyer, Prof. Taylor, Mr. Smith and others. I would suggest that, as our means may permit, the Society should purchase each year a few standard works for circulation among its members, as may be needed.

"There has been an encouraging increase in the number of members. From an original membership of about twenty, the Society has grown to a membership of fifty. In this connection I feel called upon to note the only feature of the session that admits of regret. I refer to the fact that some of our members, whose presence and interest in the proceedings would have added greatly to the profit of the meetings, did not attend more than once or twice during the year. The meetings have, however, been quite as fully attended as is usual in such associations. The smallest number in attendance at any one meeting has not been less than fifteen, though it must be confessed that a majority of those present at the meetings have not been members of the Society.

"In reviewing the year's work, as I have very briefly done, I think we may fairly conclude that the Society is to be heartily congratulated upon having made such excellent progress; and what is a still further matter of encouragement and congratulation, I feel fully justified, from the work which I know to be in progress at the hands of many of its active members, in asserting that the Society has not been formed for a year, but for years."

The Secretary-Treasurer reported that the Society had a membership of 52, and that the receipts from dues to date amounted to $72. Against this sum there had been disbursed $45.69 for printing, stationery, etc., leaving a balance in hand of $26.31. As librarian, *pro tem.*, he also reported the receipt of 281 pamphlets and seven volumes. Amongst the donors enumerated were: The Smithsonian Institution, the va-

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rious departments at Washington, and Messrs. Langlois, Beyer, Taylor and Smith. He suggested that as the Society came into funds a certain amount be appropriated yearly for the purchase of reference books.

The following officers were then elected for the ensuing session:

President	**Prof. J. H. Dillard**
First Vice President	**Prof. W. R. Dodson**
Second Vice President	**Prof. W. E. Taylor**
Third Vice President	**Prof. G. E. Beyer**
Secretary-Treasurer	**Mr. E. Foster**
Executive Committee	**Dr. O. Joachim, Mr. J. C. Smith and Mr. R. S. Cocks**

In the absence of Prof. Taylor, the Secretary-Treasurer read a paper prepared by him on "The New Geography as Applied to Louisiana.

Prof. Taylor introduced his subject by drawing attention to the unique position held by Louisiana as viewed from a geographic standpoint; the State, however, had been slow to grasp the idea, and hence prosperity had been retarded. The direct causes, he said, belonged to history, and were fully understood by all; the indirect causes belonged to physiography and biology, or the so-called "New Geography," and even science had, until recent years, failed to grasp the connection between the destinies of a people and the physiography of the country inhabited by that people. Attention was also drawn by him to the Mississippi valley as the great producing section, and the position held by Louisiana as its natural trading focus.

In discussing the importance of waterways as a means of developing the resources of a country, Prof. Taylor supported his contention by the fact that Chicago had found it more economical to trade with New York, via the Erie canal, than with New Orleans, and affirmed that the area naturally tributary to New Orleans was greater than that of either San Francisco or New York.

After touching on the meteorological conditions of this area, and pointing out the fact that while other parts of the United States had but one staple crop, Louisiana had three. Prof. Taylor sketched the historical causes which had retarded the development of the States and the progress made during recent years towards removing such barriers to progress, special stress being laid on the general belief that the section was scourged by malarial and yellow fevers and cov-

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vered by swamps. This idea, he said, almost amounted to a superstition in certain sections, and could only be removed by the question being grappled with in a scientific way.

In the study of the sciences Louisiana had done but little, the development of its biologic interests having been wholly fostered by volunteer workers. As an instance of the advantage to be derived from the development of biologic science, Prof. Taylor adduced the great oyster industry, an industry which was not only being neglected but actually destroyed. The work of other States towards the preservation of the oyster were then reviewed in detail, Prof. Taylor pointing out the fact that the United States Commission of Fish and Fisheries fully recognized the importance of such an industry and favored the location of a laboratory and fish hatchery in Louisiana waters, but that little was being done by the State towards securing such a station.*

After reviewing the biologic relation of the State to other parts of the Mississippi valley, Prof. Taylor drew a comparison between the life histories of the Gulf fauna and that of more northern localities, and concluded by a strong plea for research, not only along the lines of scientific inquiry, but on economic grounds.

Prof. Beyer contributed a short paper, embodying original research on the "Pit of the Pit Vipers." This pit, he said, was situated between the nostril and eye on each side of the face, and upon its presence or absence depended the division of the solenoglyph serpents into two sections, the *Botrophera* and *Abotrophera*.

Prof. Beyer reviewed in detail the early investigations on the pit, and noted that, so far, no characteristic of the *Botrophera* could be directly adduced to its presence. The anatomical structure, he said, justified the supposition that it was a sixth sense organ.

After discussing the structure of the nerve leading from the pit, and pointing out the analogy between such nerve and other sense organs, Prof. Beyer gave in detail his discovery of a second pit in *Crotalus atrox*, the presence of which had, up to the present, not been noted by naturalists. Its presence in *Crotalus horridus* and *C. adamanteus*, the nearest relatives to *C. atrox*, had not been noted by him, notwithstanding repeated close examinations.

Mr. R. S. Cocks contributed a note on *Selaginella apus*,

*An Act establishing a Biologic Station for the investigation of problems affecting the fish and fisheries of the State was passed by the Legislature in 1898, but no appropriation was made for its maintenance.—Ed.

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which he had found growing in profusion at Mandeville. The plants in question were nearly double the usual size and had been found growing upright, instead of in the usual recumbent position. A specimen in full fruit, and showing the two kinds of spores, was exhibited, Prof. Cocks pointing out the position of the species in the plant-world, and its characteristics as compared with the ferns and mosses.

Mr. H. H. Kopmann read a short paper on the migration of birds, noted during a visit to Point-à-la-Hache, between the 16th and 21st of May. [See Appendix, IV].

Prof. Dodson exhibited an original apparatus for the protection of bacterial cultures in tubes, which was of particular interest to the microscopical section.

SESSION 1898-1899.

MEETING OF DECEMBER 26, 1898, held at Tulane University—Vice President Dodson in the chair.

Prof. W. E. Taylor read an interesting paper, embodying the results of research regarding the "Size, Shape and Rotation of Certain Nerve Cells."

The purpose of Prof. Taylor's study had been to determine the average size, shape and position of the so-called motor-cells in the anterior lumbar region of the spinal cord, and on account of the convenience in rearing a fit subject, the white rat had been chosen, and five animals had been experimented upon.

Prof. Taylor entered into full details of the various hardening and staining fluids used in the course of the investigations, giving carefully compiled data on the action of the various stains in conjunction with the different hardening reagents. The best results had been obtained from the use of 95 per cent. alcohol as a hardener and a 1 per cent. solution of methyl blue as the stain.

The methods of dissection and of making the different sections were given, together with the methods adopted in order to get at the size and shape of the cells. Three sections

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had been taken, each in a different direction, the transverse giving the width and thickness of the cell, the vertical the length and thickness, and the horizontal the length and width. By these methods, two sets of measurements had been obtained from each axis, and thus each section corroborated the other.

From the investigations the following conclusions had been drawn: [1] That each cell possesses three unequal axes, constantly shifting their planes, yet retaining their true proportions in their lengths, and [2], that the shape of the average cell is an ellipsoid, in which one lateral axis is shorter than the other. The conclusion arrived at in regard to the rotation of the cell was that the shorter axis never becomes distinctly vertical, nor the vertical axis longitudinal.

The general result of the investigations went to prove: [1] That the average size of the larger motor cells in the lumbar region of the spinal cord of the white rat was 23x30x40mm., equal to a volume of 276,000 c. mm., and that this size remained constant for rats of different sizes and ages; [2] that the cell had three unequal axes, the form remaining constant for different ages, and [3] that while the form of the cell remained constant, the axes shifted in a definite order.

Mr. R. S. Cocks contributed a short paper on the genus *Telanthera*. [See Appendix, V].

Prof. Beyer communicated a note on "A Supposedly New Species of Terrapene" received from Avery's Island, where numbers of the species were said to be found. The main difference between the specimen in question and *T. triunguis* consisted in the absence of an entire digit in the hind foot, which in *Triunguis* showed the normal five rows of phalanges, while the specimen examined by Prof. Beyer had but four. Until other specimens could be obtained, the propriety of regarding it as a new species might be questioned.

In the discussion which followed, Prof. Taylor said that the specimen might be an abnormal form, but that duplicates would establish its right to be regarded as a new species, if not a new genus.

Prof. Dodson, in the course of a short paper broaching the question of there being "Evidence of Invisible Organisms," said that he was not aware of any investigator who had worked on the hypothesis that forms might exist of so small a size as to be invisible under the present state of microscopical technique. There were reasonable grounds for the supposition that such minute organisms might exist, and he gave

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as an instance the fact that the flagella of many bacteria were totally beyond recognition, until stained by special methods. These methods, he said, were not easy of application and required great practice on the part of the worker. It was also known that some bacteria, which could be readily stained, produced an invisible growth on certain media, thus demonstrating a peculiar effect, or rather non-effect, upon light. It was also known that living matter might exist in an invisible state, and that it was not impossible that it might exist in such a state that it could not be rendered visible. Connecting this with some other facts, he thought it might not be absurd to begin some work upon the assumption that there may be bacteria that cannot yet be seen by the methods now in use.

Prof. Taylor outlined his plan for a natural history survey of the State, which he had already advocated in a letter read before the Society on March 11. After being fully discussed, it was finally left to the following committee to take the matter under consideration: Messrs. Smith, Cocks, Taylor, Beyer and Foster.

MEETING OF FEBRUARY 3, 1899, held at Tulane University—President Dillard in the chair.

Mr. Cocks said that he wished to make a correction to his communication on the genus *Telanthera*, presented at the meeting of the 26th of December. Since the meeting he had found that Dr. Hale had collected *T. polygonides* in 1854, and had published the fact.

The special committee appointed to consider the question of a volunteer natural history survey of the state, reported that it had met and recommended that the following suggestions should be carried out:

1. That the Society divide into two sections—Zoology and Botany.

2. That each section elect a chairman.

3. That each member select the order or branch in which he or she elected to work.

The committee, in offering the report, pointed out that its decision was not unanimous; the minority, while in accord

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with the principle, being of the opinion that with the present light membership, the proposition could not yet be satisfactorily carried out.

The minority report was presented by Prof. Beyer, and after being discussed, a vote of the members present was taken, resulting in the adoption of the original report.

Mr. Cocks read an historical sketch of Louisiana Botany, to which he had added a concrete check-list* of the plants found within the limits of the state and a full bibliography. [See Appendix, VI].

Prof. Morgan exhibited some excellent drawings of the anatomy of *Dictyophorus reticulatus*. This orthopteron, he said, had been found of special use in the teaching of the anatomy of insects. He also drew the attention of the members to the epipharynx, which, he said, was probably the organ of taste in mandibulate insects.

MEETING OF MARCH 3, 1899, held at the Louisiana State University, Baton Rouge—President Dillard in the chair.

Prof. Beyer contributed a paper on the "Avifauna of Louisiana," to which he had appended a fully annotated check-list. [See Appendix, VII].

Dr. Dalrymple followed with a note on the recent occurrence of a nematode worm [*Filaria papillosa*] in the eye of a horse. [See Appendix, VIII].

Prof. Coates contributed a short paper embodying the results of recent analyses of the drinking water in and around Baton Rouge. He deprecated the use of any water for domestic uses from shallow wells. Such, he said, had invariably been found by him to be contaminated. On the other hand, in the case of cistern water he had found, in the course of extended investigations, but little that might be termed dangerous.

MEETING OF APRIL 7, 1899, held at Tulane University—President Dillard in the chair.

Dr. W. H. Dalrymple contributed an interesting paper on the "Veterinarian as a Naturalist."

In the course of his lecture, Dr. Dalrymple stated that the profession of the veterinarian embraced, perhaps, more

*Owing to the great number of additional species catalogued since the reading of Mr. Cock's paper, it has been thought advisable to defer the publication of the check-list. This course has been taken at the request of Mr. Cocks.—Ed.

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nature studies than any other, but that this fact had not, as yet, been appreciated in the South. The many branches of which he must necessarily have a knowledge made it almost impossible for the active practitioner to specialize in any one.

In a rapid survey of the ground which the veterinarian must cover, Dr. Dalrymple laid special stress on the study of botany, incidentally mentioning the fact that some medical colleges were inclined to disregard the subject, or, at all events, limit it to pharmaceutical botany.

The parasites which infest both man and animals were ably described, their life histories noted and many of their pathogenic effects detailed, special emphasis being laid on the necessity of strict inspection of all meats which were to be used as human food.

Prof. Beyer contributed a note on the occurrence of a specimen of long-tailed duck [*Clangula hyemalis*]. The bird had been shot on Bayou Barataria, Feb. 13, and was probably the first record of one seen so far south as Louisiana.

Mr. E. Foster read a paper on the "Habits and Instincts of the Mud-dauber *(Pelopœus cementarius)*," in which he controverted the generally accepted idea that this species of digger wasp merely paralyzes the spiders which form the food of the larvæ. In the examination of about forty nests he had found the maximum of such cases of "suspended animation" to be 30 per cent., while in numbers of the nests all the spiders had been killed outright. The life-history and general habits of the wasp were fully described.

MEETING OF APRIL 28, 1899, held at Tulane University—President Dillard in the chair.

A communication from the Louisiana Industrial Exposition Committee on Jubilee Celebration was read. After some discussion the matter was deferred.

Prof. W. R. Dodson contributed a paper on "The Pollination, Fertilization and Variation of the Cow Pea *(Vigna Sinensis)*," embodying the results of researches made in 1895, and verified during subsequent years, with the object of throwing some light upon the origin and constancy of the numerous varieties of the plant.

To ascertain whether, in the natural process, the pollen of a flower fertilizes the ovule of the same flower, or whether cross-fertilization takes place, seventy-eight flowers, of twen-

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ty-four varieties, had been placed under conditions calculated to exclude all foreign pollen. Half of the flowers had been isolated by means of mosquito bar netting and the remaining half by fine muslin. The first method, it was thought, would exclude all large forms of life, admitting, however, the smaller plant-lice. The meshes of the muslin were too fine, in the opinion of Prof. Dodson, to have admitted the smallest insect found about flowers. A third experiment upon twelve flowers was also carried on at the same time, the flowers being artificially fertilized. Summarizing the results of the experiments, Prof. Dodson said that ninety-five per cent. of the flowers had been found to produce pods; furnishing evidence that insect visits were not absolutely necessary for the production of seeds.

Prof. Dodson described in detail the manner in which the flowers were fertilized by the various insects, illustrating his theme by means of stereopticon views. The various observations made in regard to the time of day at which the fertilization usually takes place, through the agency of bees, were also given in detail. Details of injury to the flowers, through the agency of the common "lightning bug" were also given by the lecturer. The fact of this insect feeding on the pollen of plants had prompted an examination of a series of flowers visited by it; the result showing a lower percentage of fertilization than in case of isolated flowers.

Experiments in artificial cross-fertilization resulted successfully in only a few cases, one of such having been between a variety bearing a black seed and one bearing a white.

Prof. Dodson concluded with a short talk on the structure of different plants, which was well illustrated by means of lantern slides.

Mr. J. C. Smith contributed a note on two salt-water forms of Protozoa (*Epiclintes Sp.** and *Ceratium hirundinellà*), which he had discovered in the fresh-water ponds near Slidell, La. He classed the form *Epiclintes* as a new species, laying special stress on the fact that all of the genus hitherto described had been marine forms.

Mr. E. Foster read a short paper on the occurrence of *Trithemis umbrata* in Louisiana, exhibiting a specimen which he had taken at Abita Springs during August, 1898. A detailed description of this Central American form of dragon-

*For technical description of this new species [Epiclintes fluvialilis Smith], see Trans. Am. Micr. Soc., Vol XXI.

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fly was given by him, together with notes on its previous capture in Georgia and Texas.

Mr. Cocks spoke of certain insectivorous plants found within the limits of the State. Up to date he had secured altogether seventeen species. In regard to the so-called "Catch-fly grass" he had failed to gain any satisfactory information, although he had communicated with more than one specialist on grasses.

A vote of thanks was tendered Prof. Ayres for the admirable way in which he had managed the slides illustrating Prof. Dodson's lecture.

ANNUAL MEETING OF MAY 26, 1899, held at Tulane University.

President Dillard, in reviewing the work of the Society during the session, said:

"In my report at the close of our first year, I took advantage of the occasion to state briefly the importance of such a society as ours, and the special importance of such a society in Louisiana. I need not repeat what was then said, but I wish to emphasize the fact that the work accomplished during the present year and the development of lines of work for the future bear out fully all that was said. With a band of steady workers along inviting lines of original research and with an increasing roll of members, many of whom are taking an active interest in the work, I believe that the Society is now on a sure footing of permanent usefulness.

"At the end of the first session our membership was forty-seven. In spite of a few resignations, we are able to report an increase of seventeen, making the present membership sixty-four. I may say in this connection that it is very desirable that the Society should have members in all parts of the State. It has been resolved to enter upon a Natural History survey of the whole State, and in order to pursue this undertaking to any satisfactory degree of completeness, assistance will be needed in every part of the territory. Looking towards this work, at the suggestion of Prof. Taylor, of the Louisiana Industrial Institute, two sections have been formed among the members, one in Zoology and one in Bot-

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any, and the Society would heartily welcome the membership and active co-operation of all persons in the State who are interested in these departments.

"The first meeting of the present session was held in December, at which the paper was read by Prof. Taylor, giving the results on the "Size, Shape and Rotation of certain Nerve Cells." Three communications were presented: one from Prof. Beyer on "A Supposedly New Species of Terrapin," one from Prof. Dodson on the question whether there is "Evidence of Invisible Organisms," and one from Prof. Cocks of practical interest on the "Genus Telanthera." It was pointed out that one of the species tended to choke bayous in much the same way as the troublesome water hyacinth.

"The second meeting was held in January, when Prof. Cocks read a valuable paper on the botany of the State, with an interesting preliminary history of the work hitherto accomplished.

"The next meeting was held in March at the State University in Baton Rouge. The paper was read by Prof. Beyer on the "Avifauna of Louisiana," giving the result of years of patient labor and research in nearly every part of the State. There were also interesting communications from Dr. Dalrymple and Prof. Coates. I wish to express the appreciation of the Society at the interest shown in the proceedings by the faculty and students of the university.

"Two meetings were held in April. At the first the paper was read by Dr. Dalrymple, dealing in an able and exhaustive manner with the scientific aspect of the veterinarian's work as related to nature-study. Communications were made by Prof. Beyer on the occurrence of the Long-tailed Duck in Louisiana, and by Mr. Foster on the common "Mud-dauber," giving certain personal observations of the habits and instincts of this well-known species.

"At the second meeting in April, Prof. Dodson presented an interesting paper, illustrated by lantern, on the "Fertilization of Flowers," in which, along with general observations on this subject, he gave some account of his original investigation. Mr. Foster made a brief communication on a Central American species of Odonata in Louisiana, showing that we may expect to find here other tropical forms. Brief verbal communications were also made by Prof. Cocks and Mr. J. C. Smith. Mr. Smith noted the occurrence in fresh-water of two salt-water forms of protozoa, in addition to similar discoveries previously made.

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"This mere outline of the work of the present session barely indicates the real amount of original research and the high standard of excellence shown in the papers and communications that have been contributed. It is earnestly hoped that each year will show increase in the number of workers. The plan of inviting short communications on any definite point of observation and investigation offers opportunity of useful contribution to many who may not have the time for prolonged research. Such extension and encouragement of active interest on the part of all of its members should prove no small element of the Society's usefulness.

"The Society is also to be congratulated on the attendance of its members. I am sure that few associations of this character have a better record in this respect. The Secretary's books show that at the meetings, which others than members have attended, the average attendance of members has been over 25 per cent.

"It is proper for me to announce officially the early publication of the transactions of the Society for the past two years. The committee appointed some time since on publication has made to the executive committee its report of the papers which are to be given in full in the published proceedings. As is usual in such cases, each member of the Society will be entitled to one copy of the publication, and may buy additional copies at cost.

"I know that I speak for every member when I again express our thanks to the secretary for the excellent fullness of his minutes and for his unfailing and intelligent interest in all the work of the Society. He is also our treasurer, and in this capacity has heretofore dealt gently with us in the matter of collections. It may be that the exigencies of publication will necessitate a hardening of the heart for which I bespeak favorable consideration.

"It only remains for me to wish for my successor as pleasant and profitable intercourse with the members as it has been my privilege to enjoy."

The Secretary-Treasurer reported that the Society had now a membership of 64, and also commented on the increased attendance at the meetings. As treasurer he reported a cash balance of $80.86.

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The following officers were then elected for the ensuing session:

President.....**Prof. H. A. Morgan**
First Vice-President.....**Prof. W. R. Dodson**
Second Vice-President.....**Prof. G. E. Beyer**
Third Vice-President.....**Mr. R. S. Cocks**
Secretary-Treasurer.....**Mr. E. Foster**
Executive Committee...**Dr. O. Joachim, Mr. J. C. Smith and Mr. E. Richards**

Mr. R. S. Cocks presented a report on "The Grasses of Louisiana." [See Appendix IX].

Mr. H. H. Kopman contributed a paper on "The Turning Points in the Spring Migration of 1899." [See Appendix X].

On the motion of Prof. Beyer, Prof. Dillard, the outgoing president, was tendered a rising vote of thanks for the very valuable services he had rendered during his two years' incumbency.

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LIST OF MEMBERS.

ALISON, STEPHEN H., New Orleans.
ALLISON, ANDREW, 630 Pine St., New Orleans.

BAKER, E., Audubon Park, New Orleans.
BEER. HY, 325 Baronne St., New Orleans.
BEER, WM., Howard Memorial Library, New Orleans.
BEYER, PROF. G. E., Tulane University, New Orleans.
BIGELOW, J. O., 831 Gravier St., New Orleans.
BRUNSWIG, L N., 2624 Prytania St., New Orleans. [Resigned].
BURNETTE, PROF. F. H., La State University, Baton Rouge, La.

CALDWELL, PROF. B. C., State Normal, Natchitoches, La.
CALHOUN, HON. J. V., Baton Rouge, La.
CLENDENIN, PROF. W. W. [Resigned].
COCKS, R. S., Boys' High School, New Orleans.

DALRYMPLE, DR. W. H., La. State University, Baton Rouge, La.
DERBY, COL. G. McC., U. S. Engineer's Office, New Orleans.
DESWERTS, P., 1743 State St., New Orleans.
DILLARD, PROF. J. H., Tulane University, New Orleans.
DODSON, PROF. W. R., La. State University, Baton Rouge, La.
DONNELLY, J. A., 141 Carondelet St., New Orleans.

FEINGOLD, M., 2023 St. Charles Avenue, New Orleans.
FOSTER, E., 1811 Upperline St., New Orleans.
FRERET, F. G., 1731 Second St., New Orleans
FRIERSON, L. S., Frierson, La.

HARROD, B. M., 1637 Foucher St. New Orleans.
HERRICK, PROF. G. W., Agricultural and Mechanical College, Miss.
HUDSON, E. M., Room 404, 204 Carondelet St., New Orleans.
HUFFMAN, J. E., 336 Carondelet St., New Orleans.

JOACHIM, DR. O., 124 Baronne St., New Orleans.
JONES, MISS, 1138 Washington Avenue, New Orleans [Resigned].

KELLS, DR. C. EDMUND, 124 Baronne St., New Orleans.
KIDDER, MISS BESSIE, 14 Audubon Place, New Orleans.
KIDDER, MRS., 14 Audubon Place, New Orleans.
KIMBELL, DR. L. J., Taylor, La.
KING, MISS GRACE, 2221 Prytania St., New Orleans.
KING, MISS NINA, 2221 Prytania St., New Orleans.
KNAPP, DR. J. ROLLO, 2728 St. Charles Avenue, New Orleans.
KOHN, GUSTAV, 136 Carondelet St., New Orleans
KOPMAN, H. H., 1513 Exposition Boulevard, New Orleans.

LANGLOIS, REV. A. B., St. Martinville, La.
LOW, CLARENCE F., 14 Audubon Place, New Orleans.

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LUDLOW, MISS, Agricultural and Mechanical College, Miss.

MCCLENDON, S. E., Station B, New Orleans.
MENTZ, ——, 1275 Palmer Avenue, New Orleans.
MORGAN, PROF. H. A , La. State University, Baton Rouge, La.

ORR, DR. HY. BRISTOL, 1448 Fourth St., New Orleans.
OSBORNE, R. J. B., 7833 Elm St., New Orleans.

PANTON, C. P., Calhoun St., New Orleans

RAPIER, E. S., 1820 Baronne St., New Orleans.
ROUSSELL, DR. N., 1403 Octavia St., New Orleans.
RICHARDS, E. 1722 Calhoun St., New Orleans.

SANDERS, PROF. S. T., University High School, Baton Rouge, La.
SHIELDS, F. S., 507 Hennen Building, New Orleans.
SMITH, J. C., 1017 Berlin St., New Orleans.
SNYDER, J. Y., U. S. Custom House, New Orleans. [Resigned].
STANTON, EDWIN, 3923 Carondelet St., New Orleans.
STUBBS, DR. W. C., Louisiana State Experiment Station, Audubon Park, New Orleans.

TAYLOR, G C., Poydras, La. [Resigned].
TAYLOR, PROF. W. E., La. State Industrial Institute, Ruston, La.
THOMPSON, J. M., Covington, La.
TOWNSEND, MRS. ASHLEY, 3923 Carondelet St., New Orleans.

WEDDERIN, CARL, 2331 Constance St., New Orleans.
WESTFELDT, G. R., 618 Gravier St., New Orleans.
WHEELER, PROF. W. M., Texas University, Austin, Texas.
WILLIAMSON, PROF. GEO., State Normal, Natchitoches, La.

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APPENDIX.

I. Louisiana Herpetology—Prof. Geo. E. Beyer.

II. The Greater Agarics, with Special Reference to their Poisonous and Non-poisonous Qualities—Rev. A. B. Langlois.

III. Report on a Small Collection of Hymenoptera.—E. Foster.

IV. Notes on Bird Migration, 1898.--H. H. Kopman.

V. Notes on the Genus Telanthera.--R. S. Cocks.

VI. Historical Sketch of Louisiana Botany.--R. S. Cocks.

VII. The Avifauna of Louisiana.--Prof. Geo. E. Beyer.

VIII. Note on the Occurrence of Filaria Papillosa.--W. H. Dalrymple, M. R. C. V S

IX. The Grasses of Louisiana.--R. S. Cocks.

X. Turning Points in the Spring Migration of 1899.--H. H. Kopman.

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APPENDIX I.

LOUISIANA HERPETOLOGY.

GEO. E. BEYER.

(Communicated December 17, 1897.)

The object of the present paper is to serve as an introduction to the herpetology of our State, and to be the foundation of a check-list, which may possibly be enlarged by future additions, after the doubtful forms have been more fully and unquestionably established.

While the study of the Reptiles and Batrachians has found many disciples, and much information in regard to their life-histories, their geographical distribution, etc., has been elicited, there is no class of the animal kingdom of which there still exists such gross ignorance, or which has been, through lack of interest and general observation, subjected to so much superstitious abhorrence as the creatures confined within its accepted limits. Important points of the history of many forms remain unknown to this day, and biologists have striven in vain to clear these obscurities or to controvert purposely exaggerated accounts of popular errors by established facts.

Animal life, it is well known, has been divided into several faunal regions, each exhibiting certain pronounced peculiarities, due to climatic and topographical influences. Thus the peculiar condition of a certain district or realm is reproduced, as it were, in the nature of its living inhabitants.

The North-American or Nearctic realm presents in the distribution of types six well-defined sections or subdivisions, which are commonly known as the Eastern, Central, Pacific, Sonoran, Lower Californian and Austro-riparian regions, all of which present marked peculiarities, either in an abundance, or a total absence of certain forms. The latter region comprises North Carolina, Georgia, Tennessee, Florida, Alabama, Mississippi, Louisiana and Texas, and in it we find the greatest development of eastern reptile life. A number

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of genera are confined to its boundaries, while the Eastern region possesses no forms exclusively its own; all genera being distributed over some, or all of the other regions.

The reptiles which are distinctly peculiar to the Austro-riparian region embrace some 25 genera, a few of which are also representatives of the Neotropic realm. The Louisiana district exhibits all the characteristics of the Austro-riparian region, lacking, however, to some extent, those of Texas and Florida. The entire reptilian fauna of the State may be said to be represented by about 114 species, belonging to 56 genera; representing 25 families in 8 orders. It is possible, however, that this list may be considerably augmented by species which are, so far, supposed to be confined to the Florida and Texas districts. In general, the enumeration may be accepted as adequately correct, for the species of this class are, more or less, confined to their native localities, as migration, in the stricter acceptation of the term, can scarcely be ascribed to any reptile. Aquatic forms may gain considerable distribution by means of their element, but beyond that they would encounter obstacles over which wings only could transport them. On the other hand, terrestrial forms would be even more effectually checked in their attempts to extend their original habitat. It is true, however, that a certain species may occur in localities which are separated by apparently insurmountable obstacles, and we can only account for such an instance by the supposition that at one time or other such barriers did not exist.

Certain localities of our state are marked either by an entire absence, or a greater abundance of forms. The southern section presents marked features in this respect in aquatic types of Ophidians. Here, also, the alligators are present in greater numbers, while the Testudinata, in general, are almost entirely confined to Southern Louisiana. The hilly parts, the pine-flats and pine-hills have each their peculiar representatives. The majority of the Lacertilia, the only Proteroglyph, as well as all Solenoglyph snakes, with one exception, are found in far the greater number in upper Louisiana. Isolated and prominent in these respects stands Avery Island [Petit Anse] as a kind of haven for almost the entire reptile world of the state. Surrounded by immense tracts of marshes and swamps, in themselves a congenial habitat for the more or less aquatic types, this hilly, forest-covered island harbors almost all the more terrestrial forms. In fact, this

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comparatively small area is an ideal paradise for the ornithologist as well as the herpetologist. Comparing the natural topography of upper Louisiana and its identic forms, with this small island on the extreme southwestern coast, and considering [for some reptiles] the almost insurmountable regions which intervene, we have an illustration of such a distribution, which we can only explain by a formerly non-existing separation of the two localities.

In regard to distribution of the reptilian fauna of the state, it will be advisable to proceed in the order of systematic classification.

The Batrachians are represented by four orders: the *Proteida, Trachystomata, Urodela and Salientia.*

With the exception of the European species, the *Proteus anguinus* [the "Olm" of the Germans], the American *Necturus maculatus* furnishes us the only animal which may really and truly be termed amphibious. The larval gills being persistent, it can live independently either in or out of the water at any period of its life.

The Trachystomata are represented in Louisiana by two genera, each with but one species—*Siren lacertina* and *Cryptobranchus allegheniensis.*

The tailed Batrachians, or Urodela, are typified by a number of highly interesting forms belonging to five families. The well known and unjustly supposed poisonous Congo Eel belongs to this order. Several species of *Amblystoma* are popularly known as "Ground Puppies," and are to be found under decaying logs in almost every part of the state. The *Desmognathidæ* furnish the student a species of Salamander [*Desmognathus fusca*], which is remarkable for the peculiar care which the male takes of the ova. The eggs, connected by an albuminous covering which soon dries and shrivels up, are wrapped like a string of beads around the body, and carried by the male until hatched. The same procedure is performed by the male of the well known "Geburtshelfer Kröte" [*Alytes obstetricans*] of middle Germany.

Last, but not least, we must now consider the remaining order of Batrachians: the tailless or *Anura*, among which we may recognize many of the midnight musicians of our swamps and bayous.

The frogs and toads have been classified by investigators into four sub-orders: the *Bufoniformia*, or true toads; the *Arcifera*, with the spade-foot and tree frogs; the *Firmisternia*,

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with a single genus and species [*Engystoma carolinense*], the Carolina tree toad, and lastly the true frogs [*Raniformia*], with but a single genus, furnishing the bandmaster par excellence—the bull frog [*Rana catesbiana*].

A few remarks on the toxic qualities of some of the members of both the *Urodela* and *Anura* may not be out of place. That the secretions, especially of the parotid glands of the salamanders and toads, contain poisonous principles [irritating chiefly all mucous linings with which the secretion is brought in contact], there can be no doubt, but its virulence has been greatly exaggerated. The animals have not even the power of using the secretion in the offensive. Upon some animals [some reptiles for instance] it has no effect, even if introduced into the stomach. I know of no animal or bird which feeds on toads or salamanders, and certain snakes, while even feeding on other *Anura*, will rather perish by starvation than swallow a toad. Our common "hognose" or spreading adder, on the other hand, prefers toads to other food. The secretion is milky and viscid, and has a sharp, bitter taste. Introduced into the stomach of small animals it causes restlessness, trembling, sometimes vomiting and finally convulsions and death.

With the approach of spring, the active life of one of the most dreaded classes of the animal kingdom, [that of the Reptiles], which during the winter months had been almost suspended, is ushered in and enters into full operation. Although the dread which attaches to these animals, especially in the more temperate regions, is greatly exaggerated, there are, however, a number of them found in our midst which, on account of their poisonous qualities, must be feared. In the entire class of reptiles but one order, the Ophidians, contains these dangerous creatures. In our state they are restricted to the small number of six species, and all are easily distinguished from their harmless and, in many instances, useful congeners.

So for as I have been able to determine, forty-seven species of snakes are to be found in Louisiana, but, as I have stated, only six are venomous, and no matter what the deportment of some of the rest may be, they need not be feared, nor will any ill effects arise from their bites.

Considering first the venomous members of the order, [which has been divided into two groups]: the *Proteroglypha*, or such in which the poison fangs are immovably attached

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to the upper maxilla and fit into corresponding grooves of the inferior one.

This group is represented in Louisiana by but one species the Harlequin snake *(Elaps fulvius)*. It is a conspicuously marked reptile, but by no means very commonly encountered, by reason of its burrowing habits. It is generally found in decaying logs. While other members of the genus are extremely dangerous, this cannot be said of our Harlequin snake. The structure of the poison-fangs is different from that of the *Solenoglypha*. In *Elaps* the tooth is really perforated like a tube, whereas in the Solenoglyph snakes the fangs are grooved anteriorly, but the edges of the groove are anchylosed in their middle portion, leaving the fangs open in front, above and below.

Solenoglyph snakes are such as are able to erect or depress the poison-fangs at will. The members of this suborder found in Louisiana, and in fact on the entire western continent, belong to the division of *Bothrophora* or Pit-vipers. The existence of a peculiar deep depression, situated between the nostril and eye, distinguishes them from the *Abothrophora*—Solenoglyph snakes of the Old World.

The *Solenoglypha* are represented by three genera of the family *Crotalidae*, or Rattlesnakes: *Crotalus*, *Sistrurus* and *Agkistrodon*.

The genus *Crotalus* gives us two of the largest and most dangerous of the Ophidians, not only for our state but for the entire North American continent. In fact, *Crotalus adamanteus* stands not behind in size to the most dangerous of all snakes of the western hemisphere, the terrible "Fer-de-lance" of Martinique and Guadeloupe and its darker congener oft he Central American continent.

The chief locality in which I have met the Diamond Ratler is St. Tammany parish; in the hummock lands which border the pine-flats on the one side and the water-courses on the other. The largest I obtained there several years ago measured six feet, three inches in length, by a trifle over four inches in diameter. While this measurement is considerably above the average, Florida specimens of over eight feet in length are claimed to have been taken. Like all of our poisonous snakes, the Diamond Rattlers, especially the larger ones, are becoming rarer and rarer as the reclamation of our forests and swamps is extended. After the first shock upon unexpectedly meeting this reptile is overcome, and its almost

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continually moving coils, with the really graceful position of the head and neck, are watched, any one must admit that there is something beautiful even in this dangerous creature. The contour of the head is somewhat more obtuse than that of the Cane Rattler [*Crotalus horridus*]. It is shorter and thicker, and the venom glands are more prominently outlined. The eyes are small and emit, when the animal is alarmed or enraged, an ominous glitter, but the idea that the snake [or for that matter any others of this order] possesses the power of charming is, of course, erroneous. Fright on seeing the death-dealing serpent so close at hand seems to deprive man and animal alike of all power of thought and locomotion, and very often the next instant the fatal stroke or thrust [but not bite] is delivered. The action of the stroke is lightning-like, and must be seen to be appreciated. I have repeatedly seen small animals succumb instantaneously to the influence of the poison. A squeak, a few tremors passing through the body, and the thread of life was cut asunder. Even hunting dogs, which are frequently bitten by our Water Moccasin [*Agkistrodon piscivorus*] without exhibiting more than some distress and uneasiness attended for some hours by swelling, succumb quickly to the venom of our rattlesnakes.

A few words explanatory of the apparatus which conveys the fearful fluid may be in order. It may be divided into three essential parts: the gland itself; a short canal or tube and the fang. The latter is the hypodermic needle and the gland and canal the hypodermic bulb-syringe.

The principal bones of the poison apparatus are the external pterygoid, the internal pterygoid, the palatal, the maxillary and the lachrymal. The spheno-pterygoid elevates the fang; the ecto-pterygoid depresses the fang, which, when not erected, is hidden by a thick fold of skin—the vagina dentis. The gland is situated at the base of the skull, between the quadrate bone and inferior maxilla. The canal, which first bends upwards and then downwards, does not form a continuation of the cavity of the fang, but opens independently on the surface of the maxillary bone. The venom is prevented from being wasted by the tightening of the vagina dentis, and forced by it to flow into and through the anchylosed canal of the fang. The gland, being enveloped by a coating of unstriated muscles, contracts and discharges some of its contents at the moment the action of thrust is performed.

The venom itself is but a modification of the saliva in other animals, and certainly proves a most powerful and rapid

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digestive agent by causing putrefaction of the animal substances. The color of the poison varies from very pale to deep yellow. Exposed to the air it dries rapidly, and on glass has the appearance of varnish, but, unlike it or any similar liquid, cracking in a very characteristic manner. In dessicated form, or mixed with alcohol or glycerine, it will retain its vitality indefinitely without losing any of its strength. If fresh venom be allowed to stand undisturbed in a vial for some time, it becomes cloudy and finally a sediment will form at the bottom, consisting of epithelial cells, micrococci and both red and white corpuscles. Introduced into an animal these solid parts produce no effects, but the clear liquid continues to act as if it had not been separated from the former substances. Venom is really a compound, consisting of several [at least two] proteids, either of which is sufficient to cause death, acting differently however upon the system. The percentage of the proteids in the compound is different, not only in different species, but in individuals. This, of course, explains the reason why the successive symptoms as well as the attending results are subject to such great variation. Moreover, the influence of the venom upon the system is so exceedingly rapid and powerful, and manifests itself in such different ways, that it appears almost beyond our power to combat with certainty in all cases the inroads of the disease. Snake poison introduced into a warm-blooded animal may induce death through several affections. It may occur through paralysis of the heart; through hemorrhages of the spinal cord, or rather the medulla; through the thoroughly altered condition of the red corpuscles, which through losing their biconcave form, are prevented from oxygenating the vital fluid, and lastly and generally through paralysis of the respiratory nerve-centers, or, in other words, suffocation.

The venom of the five Solenoglyph serpents of Louisiana may be graded successively as follows: the most powerful that of *Crotalus adamanteus;* secondly, that of *C. horridus*, followed by *Sistrurus miliarius*, which only stands behind in the case of actual bite, on account of the inferior size of the animal, but which administered in equal doses is about as rapidly acting as the venom of *C. horridus*. The poison of *Agkistrodon contortrix* is somewhat slower in action than the others; that of *A. piscivorus* is about of the same strength but somewhat below in standard.

The non-venomous snakes, or *Asinea* constitute by far the largest number of the reptiles of the state. All of them,

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however, belong to one family [*Colubridae*] of 15 genera and 41 species. Page upon page might be devoted to a description of the various and, at times, highly interesting forms, but that is not the object of this paper.

The second order [*Lacertilia*] is, with one exception, less represented than any. Louisiana has but eight species of lizards, showing, however, a great diversity of forms in the five families into which they are placed. The well-known forms of *Anolis* and *Sceloporus* give us the types of true lizards, but the uninitiated would scarcely recognize a lizard in our common Glass-snake [*Opheosaurus ventralis*]. There is no need of my entering into a refutation of the exaggerated accounts of reproduction, such as if a Glass-snake be cut into several pieces, each portion will become a new individual. The species simply does not belong to the Cœlenterates or Sea-anemones.

Twenty-three species of turtles, with possibly a few future additions, constitute the fauna of the order of *Testudinata* in Louisiana. From the immense Loggerhead down to the small Mudbox, a great variety of structure is displayed. Of the six families of turtles of North America, five occur in our state, and it is even possible that the sixth does occasionally occur on our coast-line in one or another species of Sea turtles.

The *Trionychidae* [Soft-shell turtles] are exceedingly common in most of our rivers and bayous. For the Swamp-turtles our state is pre-eminently the home. In some localities it is impossible to pass along a water-course without seeing numbers of them basking on floating logs or lying on the banks. During a drought, when the swamps have dried out, and only the holes of alligators contain water, then is the time for the collector. Several years ago I took 35 specimens of *Pseudemys troostii* from one small alligator hole in St. Tammany parish.

The last reptile which we have to consider, is also the sole representative of the order of *Crocodilia*. The family *Crocodilidae* consists of only two genera: *Alligator* and *Crocodilus*. While I have heard occasional reports of the occurrence of the American Crocodile in our state, I have never been able to verify the statements, and I firmly believe that we will have to content ourselves with the fast disappearing Alligator [*Alligator mississippiensis*]. The persecution to which this animal has been subjected during the past twenty-five years has reduced its numbers to an astonishing degree. In twenty-five more years, alligators captured in Louisiana

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will be somewhat of a curiosity. The accounts of the size of some individuals of this species are greatly exaggerated. Animals of more than twelve feet in length have been very rare for many years. One captured in Bayou Lafourche during the summer of 1884 measured fourteen feet, nine inches, and was then considered a monster of its kind.

In conclusion I wish to record my thanks for the great assistance rendered me by Mr. Gustave Kohn, of New Orleans, who has generously placed his large collection of local mateial and personal data at my disposal in the preparation of the subjoined check-list.

CHECK-LIST OF THE BATRACHIANS AND REPTILES OF LOUISIANA.

BATRACHIA

Order PROTEIDA.

Family PROTEIDÆ.

1. **Necturus maculatus** Rafinesque. *Lake Siren; Proteus.*

This species seems to occupy a very restricted area in Louisiana. I have collected it once only—in Caldwell parish. In the southern parts it does not seem to exist at all.

Order TRACHYSTOMATA.

Family SIRENIDÆ.

2. **Siren lacertina** Linn. *Mud Eel; Siren.*

I believe this species occurs only in middle and northwestern Louisiana. It has, thus far, never been reported from the southern parishes.

Family CRYPTOBRANCHIDÆ.

3. **Cryptobranchus allegheniensis** Daud. *Hellbender.*

I have never obtained this form in the state, but it has been found in several of the northern parishes. Specimens

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from Prairie Mer Rouge are in the United States National Museum.

Order URODELA.

Family AMBLYSTOMIDÆ.

4. **Amblystoma talpoideum** Holb. *Tadpole; Salamander.*

As a rule, not so common as the following three species. It is found under logs and stones, in wet places in the higher parts of the state.

5. **Amblystoma opacum** Gravenhorst. *Marbled Salamander.*

Occurs in the same localities as the preceding species.

6. **Amblystoma punctatum** Linn. *Spotted Salamander.*

This species is, by far, the most common in the state. Known wherever it occurs as "Ground Puppy."

7. **Amblystoma tigrinum** Green. *Tiger Salamander.*

Resembling very much the former, it is, however, somewhat larger and heavier. Its range is much the same, and it is common wherever found.

8. **Chondrotus microstomus** Cope. *Porphyry Salamander.*

Very common in several sections of the state.

Family PLETHODONTIDÆ.

9. **Plethodon glutinosus** Green. *Slimy Salamander.*

This species I have found only in single instances—in northwestern Louisiana. Mr. Gustave Kohn, however, reports it as common in St. Tammany parish.

10. **Manculus quadridigitatus** Holb. *Four-fingered Salamander.*

This exceedingly small species is (according to Mr. Kohn) very plentiful in some parts of St. Tammany parish. It undoubtedly exists in other sections of the state, but, so far, I have not discovered it.

11. **Spelerpes bilineatus** Green. *Green's Triton.*

Mr. Kohn's records are, thus far, the only ones I have on this Triton. He obtained his specimens in the vicinity of Mandeville.

12. **Spelerpes guttolineatus** Holb. *Holbrook's Triton.*

I have obtained only a single individual of this species—near Como. Consequently I have no idea whether it is common or not.

13. **Spelerpes ruber** Daud. *Red Triton.*

This exceedingly handsome Triton may be said to be fairly common. I have collected it in St. Tammany Parish,

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but found it rather more common in northwestern Louisiana.

Family DESMOGNATHIDÆ.

14. **Desmognathus fusca** Raf. *Brown Triton.*

Exceedingly common in almost every section of the state.

Family PLEURODELIDÆ.

15. **Diemyctylus viridescens** Raf. *Green Triton.*

This pretty Triton is very common in the clear water-courses of northwest Louisiana. Unlike other Tritons, it is never found on land hidden under stones or logs. Mr. Kohn reports it from Mandeville as common.

Family AMPHIUMIDÆ.

16. **Amphiuma means** Gard. *Amphiuma, Congo Eel.*

This large and unprepossessing species is abundantly distributed over the state; known and unjustly dreaded by everyone, as its large and popular nomenclature testifies. In the southern sections of the state it is particularly abundant, and known as "Congo Eel," "Blind Eel" or "Congo Snake."

SALIENTIA.

Order BUFONIFORMIA.

Family BUFONIDÆ.

17. **Bufo lentiginosus americanus** Lec. *Common Toad.*

This species of toad is abundantly distributed over the state; the most arid pine-flats, as well as the high lands affording it congenial habitat.

18. **Bufo lentiginosus lentiginosus** Shaw. *Latreille's Toad.*

Like the preceding, abundant everywhere.

19. **Bufo valliceps** Wiegm. *Nebulous Toad.*

Reported as common from New Orleans by Dr. R. W. Shufeldt; from Baton Rouge by Prof. King, and by G. Wurdemann from Calcasieu Pass. Notwithstanding, neither Mr. Kohn nor myself have, so far, taken it in Louisiana.*

*Two specimens have since (July, 1899) been taken by me at Como, La.--G. E. B.

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Order ARCIFERA.

Family SCAPHIOPIDÆ.

20. **Scaphiopus holbrookii** Harlan. *Holbrook's Spade-foot.*

Locally confined; not as common in the state as the other toads. I have collected it in Franklin parish. Mr. Kohn reports it from the vicinity of Mandeville.

Family HYLIDAE.

21. **Acris gryllus gryllus** Le Conte. *Cricket Frog.*

Abundant in many parts of the state, preferring, however, the hummock lands.

22. **Acris gryllus crepitans** Baird. *Western Cricket Frog.*

Scarcely to be distinguished from the preceding; equally as plentiful, and frequenting the same localities. Intermediate forms between *A. gryllus gryllus* and *A. gryllus crepitans* are very common, rendering definite identification difficult.

23. **Chorophilus nigritus** Le Conte. *Black Tree Frog.*

Exceedingly common.

24. **Chorophilus feriarum** Baird. *Tree Frog.*

Like the preceding species, exceedingly common.

25. **Hyla pickeringii** Storer. *Pickering's Tree Toad.*

Common in all sections.

26. **Hyla squirella** Bosc. *Tree Toad.*

Very common in nearly every part of the state, especially so in the low and marshy sections. In and about New Orleans it is the most abundant of all tree-toads.

27. **Hyla carolinensis** Pennant. *Carolina Tree Toad.*

Abundant everywhere.

28. **Hyla femoralis** Latr. *Femoral Tree Toad.*

Not common, at least not as much so as the other species of tree-toads of the state. Mr. Kohn secured specimens in St. Tammany parish.

29. **Hyla versicolor** Le Conte. *Changeable Tree Toad.*

Scarce in the marshy sections, it is, however, abundant in all other parts of the state.

Order FIRMISTERNIA.

Family ENGYSTOMIDÆ.

30. **Engystoma carolinense** Holbrook. *Carolina Tree Frog.*

Common in all parts of the state. Being extremely shy, it is rarely noticed unless looked for.

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Family RANIDÆ.

31. **Rana pipiens** Gmelin. *Common Water Frog.*

Abundant in all parts of the state in suitable localities.

32. **Rana palustris** Le Conte. *Swamp Frog.*

Not quite as common as the preceding, occurring, however, nearly all over the state.

(33. **Rana areolata areolata** Bd. & Gir. *Texas Frog.*

This species was discovered in July, 1899, at Como, Franklin parish, under a plank in a yard. A second and third specimen were taken a few weeks later in the same yard in an old well. These are, so far, the only records for this species for Louisiana).

34. **Rana clamata** Daudin. *Spring Frog.*

Very common in all sections; not collecting in numbers like *R. pipiens*, it never appears as abundant as the latter.

35. **Rana catesbiana** Shaw. *Bull Frog.*

Thls, the best known and largest of all our frogs, is found in nearly every section of the state, most abundantly, however in the southern.

REPTILIA.

Order OPHIDIA.

Sub-order ASINEA.

Family COLUBRIDÆ.

1. **Carphophiops amoenus** Say. *Worm Snake.*

This small snake is not rare in some parts of the state. It escapes notice, however, through its retired life under decaying logs. I have found it near Madisonville, St. Tammany parish.

2. **Carphophiops vermis** Kennicott. *Western Worm Snake.*

In size and appearance similar to the preceding; living in the same locations, but not quite as common.

3. **Tantilla coronata** Bd. and Gir. *Crowned Tantilla.*

This small and insignificant looking snake is probably the only representative of the Ophistoglyphs in our state.

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So far, neither Mr. Kohn nor myself have taken it in Louisiana, but it is reported as fairly common in the northwestern section. It is generally found under logs.

4. **Cemophora coccinea** Blumenbach. *Scarlet Snake.*

Not common, it occurs, however, in nearly every part of the state, except the extreme southern portion.

5. **Farancia abacura** Holbrook. *Horn Snake.*

Not found in the higher sections, but in some places in the lower, very common. In the vicinity of New Orleans it is abundant. There is no snake about which more popular errors and absurdities are circulated than this.

6. **Lampropeltis coccineus** Schleg. *Red King Snake.*

In the hummocks bordering on the pine regions, this reptile is very conspicuous and fairly common.

7. **Lampropeltis syspilus** Cope. *Red King Snake.*

Greatly resembling the preceding, it shares with it the same localities and is fairly common.

8. **Lampropeltis doliatus** Linn. *Scarlet King Snake.*

Of the red, black and yellow-ringed King snakes, this species is the most common, occurring in almost every part of the state. Burrowing in the sandy soil, it is frequently brought to notice by the plow.

9. **Lampropeltis clericus** Bd. & Gir. *Red King Snake.*

Probably of the same distribution as the preceding. Mr. Kohn obtained this species from the vicinity of Mandeville.

10. **Lampropeltis sayi** Holbrook. *King Snake.*

Abundant in lower Louisiana; less so in the higher sections.

11. **Diadophis punctatus** Linn. *Ring-necked Snake.*

Common enough in most parts of the state, but easily overlooked on account of its diminutive size.

12. **Diadophis stictogenys** Cope. *Texas Ring-necked Snake.*

Resembling the preceding it also shares the same habitat. Common.

13. **Cyclophis aestivus** Linn *Southern Green Snake.*

Generally abundant in such localities where it occurs. While its distribution in the state is general, it is absent from some localities.

14. **Bascanium constrictor** Linn. *Black Runner; Black Racer; Blue Runner.*

Of the terrestial snakes, this species is probably the most abundant and best known in the state; occurring in two color

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phases, a black one, restricted to high and dry regions, and a pinkish or bluish-gray phase in the swamp lands.

15. **Bascanium flagellum** Shaw. *Coach Whip.*

I have seen this species but once in the course of fifteen years on the east side of the Mississippi. It is, however, very common west of the river. In some parts of Catahoula and Nachitoches it is abundant.

16. **Coluber guttatus** Linn. *Chicken Snake.*

Fairly common in the pine-wood regions, often entering houses and frightening the occupants by making an empty pot on the kitchen shelf its temporary domicile. It is not found in the swamp lands, being strictly terrestrial in its habits.

17. **Coluber obsoletus obsoletus** Say. *Black Chicken Snake.*

Rather a rare snake, at least more so than any of the Colubers of the state. Mr. Kohn has obtained it from St. Tammany parish.

18. **Coluber obsoletus confinis** Bd. and Gir. *Live Oak Snake.*

One of the commonest of our Colubers. It is especially met with in the swamp lands, where its favorite position is to lie at full length in the tops of tall grasses and canes. It is one of our longest snakes.

19. **Coluber spiloides** Dum. & Bibr. *Red-headed Chicken Snake.*

Fairly common. I have found it on Avery's Island and in the vicinity of New Orleans. Unlike the preceding, it is ess aquatic in its habits.

20. **Spilotes corais couperii** Holbrook. *Indigo Snake.*

Although I have never met with this snake in Louisiana, it is certainly to be found within its precincts, if not commonly. It has been collected in all other Gulf states, from Texas to Florida.

21. **Heterodon platyrhinus** Latr. Hog-nose; *Spreading Adder.*

A strictly terrestial species; generally distributed throughout the state, and common.

22. **Heterodon platyrhinus niger** Latr. *Black Viper.*

In habits and distribution the same as the preceding, but less common.

23. **Heterodon simus** Linn. *Sand Viper.*

I have obtained but one specimen of the Sand Viper in the state. I secured it in Washington parish not far from Franklinton. I have no doubt of its being fairly common there.

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24. **Thamnophis proxima** Say. *Garter Snake.*

One of the most numerous of all snakes of Louisiana. Occurring in all parts of the state, but is very partial to the proximity of water.

25. **Thamnophis sirtalis** Linn. *Garter Snake; Striped Snake.*

Nearly as common as *T. Proxima* and as equally distributed.

26. **Thamnophis sirtalis dorsalis** Bd. and Gir. *Churchill's Garter Snake.*

During two successive summers I collected this species in the city of New Orleans. I kept them alive on account of their exceedingly handsome markings, and especially distinct red dorsal stripe. Since then [1892 and 1893] I have not succeeded in getting other specimens, the old locality having been built up in recent years.

27. **Thamnophis saurita** Linn. *Ribbon Snake.*

Notwithstanding this species being known to belong to the Austro-riparian region, I have never succeeded in obtaining it in the state.

28. **Natrix grahamii** Bd. and Gir. *Graham's Water Snake.*

Very common in the southern section of the state; in the vicinity of New Orleans one of the most abundant of water snakes. I have not found it in northern Louisiana.

29. **Natrix rigida** Say. *Brown Water Snake.*

Not quite as common as the preceding, but having about the same range. I have found it quite numerous along the shores of Lake Catawatchi and Lake Salvador.

30 **Natrix clarkii** Bd. and Gir. *Clark's Water Snake.*

Not common. Strictly confined to the southern section.

31. **Natrix fasciata fasciata** Linn. *Banded Water Snake.*

Generally distributed throughout the state, and exceedingly common everywhere. It is represented by several color varieties, which have been made into sub-species, but scarcely merit such elevation, since the characteristic differences from the type are exceedingly variable and intergrading. I have, however, included the different varieties in this catalogue but it is impossible to define any geographical range.

32 **Natrix fasciata sipedon** Linn. *Water Moccasin.*

33. **Natrix fasciata pleuralis** Cope. *Water Snake.*

34. **Natrix fasciata transversa** Hallow. *Woodhouse's Water Snake.*

35. **Natrix fasciata erythrogaster** Shaw. *Red-bellied Water Snake.*

This last mentioned variety seems to be the most com-

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mon, as well as the most constant of the four; occurring principally in the southern parts.

36. **Natrix rhombifera** Hallow. *Holbrook's Water Snake.*

Abundant, especially in the southern section. In the vicinity of New Orleans there is scarcely a water-hole that is not inhabited by an individual of this species.

37. **Natrix cyclopium** Dum. and Bibr. *Water Snake.*

Very rare, and apparently confined to the southern parts of the state.

38. **Natrix taxispilota** Holbrook. *Brown Water Snake; Aspic.*

Common throughout the state; conspicuous by its coloring and size.

39. **Storeria deKayi** Holbrook. *Brown Grass Snake.*

Abundant throughout the state.

40. **Storeria occipitomaculata** Storer. *Storer's Grass Snake.*

Not very common, nor is it as generally distributed. Unlike the preceding, it apparently prefers the pine regions.

41. **Haldea striatula** Linn. *Brown Snake.*

A small worm-like snake, fairly common under decaying logs in most parts of the state.

Sub-order PROTEROGLYPHA.

Family ELAPIDÆ

42. **Elaps fulvius** Linn. *Harlequin Snake.*

This sole representative of the Proteroglypha is generally distributed throughout the state, the swamp and marsh regions excepted. In the hummock lands it is not uncommon, but, nevertheless, is only accidentally met with. Rotten logs and stumps are its favorite hiding places. The oft repeated paragraph of Holbrook in regard to the habits of the Harlequin snake, that "it is found underground in the sweet potato fields, and is frequently dug up by the laborers when harvesting," seems to be founded on mistaken identity. This habit belongs decidedly to the similarly colored species of *Lampropeltis* but not to *Elaps*. *Lampropeltis doliatus* and *L. syspilus* I have obtained dozens of times in the manner related by Holbrook, never once a Harlequin or "Thunder and Lightning" snake.

Sub-order SOLENOGLYPHA.

Family CROTALIDÆ.

43. **Agkistrodon contortrix** Linn. *Copperhead; Highland Moccasin.*

Once abundant throughout the state, this species has

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now almost entirely disappeared from some localities. In the marshy sections it does not occur at all, and in the open pine regions it is rare. Its favorite haunts are the hummocks, cane-brakes and old fields. It is still very common on Avery's Island.

44. **Agkistrodon piscivorus** Lac. *Water Moccasin.*

Very abundant in lower Louisiana, especially on the prairies and in gum swamps. In the rice fields it is dreaded by the negroes, by whom it is called "Cotton-mouth," on account of its peculiar habit of spreading the mouth wide open upon being disturbed. Against the dark brown color of the reptile, the pale pink mouth appears perfectly white, like an open boll of cotton.

45. **Sistrurus miliarius** Linn. *Ground Rattlesnake.*

Preferring dry localities for its habitat, this snake is absent from the swampy and marshy sections. In the pine regions and hummocks it is fairly common, living among leaves and other rubbish, and thereby escaping notice.

46. **Crotalus horridus** Linn. *Banded Rattlesnake.*

Throughout the pine regions, in cane-fields and old fields overgrown with young trees and weeds, the Cane Rattler is still fairly common, but in the more thickly populated sections it has become rare.

47. **Crotalus adamanteus** Beauv. *Diamond Rattlesnake.*

This, one of the largest of the venomous snakes of the western hemisphere, occurs only [according to my observations] in the southern portion of the Florida parishes, and along the east bank of the Mississippi. I have never found it west of that river, and I doubt its occurrence there. I have caught several near Madisonville, St. Tammany parish, in the hummocks along the margins of the gum swamps. Unlike the Cane Rattler, this species is very fond of the vicinity of water. Both species are in the habit of coiling themselves up alongside a fallen tree, and many persons have thus narrowly escaped stepping on the snake on the other side of the log.

Order LACERTILIA.

Family SCINCIDÆ.

1. **Oligosoma laterale** Say. *Ground Lizard.*

This little creature is abundant everywhere; unjustly decried as poisonous and invested with the misnomer "Scorpion."

2. **Eumeces fasciatus** Linn. *Blue-tailed Lizard; Red-headed Skink.*

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Like the preceding, abundant everywhere and absurdly believed to be poisonous. It also bears the name "Scorpion."

Family TEIIDÆ.

3. **Cnemidophorus sexlineatus** Linn. *Six-striped Lizard.*

The least common of the lizards of Louisiana, and occurring only in the sandy pine regions.

Family ANGUIDÆ.

4. **Opheosaurus ventralis** Daudin. *Glass Snake.*

This well-known reptile is common in nearly all parts of the state, escaping detection, however, on account of its burrowing habits.

Family IGUANIDÆ.

5. **Sceloporus undulatus** Harlan. *Alligator Lizard.*

Abundant in the pine woods; especially fond of rail fences and deserted houses.

6. **Sceloporus floridanus** Bd. *Florida Alligator Lizard.*

In general appearance, much like the preceding, but larger. I have found this species only in the swampy hummocks of West Feliciana, where it is fairly common.

7. **Phrynosoma cornutum** Harlan. *Horned Lizard; Horned Toad.*

This lizard occurs only in the northwestern section of the state. It is reported from the vicinity of Monroe as fairly common.

Family ANOLIDÆ.

8. **Anolis carolinensis** Linn. *Green Lizard; Chameleon.*

The most abundant of all the lizards of Louisiana; occurring in all sections, irrespective of topographical characters.

Order TESTUDINATA.

Sub-order CRYPTODIRA.

Family TRIONYCHIDÆ.

1. **Aspidonectus asper** Agassiz. *Soft-shelled Turtle.*

Abundant in all inland waters, preferring, however, such bayous which have sloping and sandy banks, upon which they are fond of sunning themselves.

2. **Aspidonectus emoryi** Agassiz. *Emory's Soft-shelled Turtle.*

In habits and distribution much the same as preceding; equally common in northern Louisiana as it is farther south.

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Family CHELYDRIDÆ.

3. **Chelydra serpentina** Linn. *Snapping Turtle.*

Common in all parts of the state; occurring principally in the larger rivers and bayous.

4. **Macrochelys lacertina** Schweigger. *Logger-head; Caouana.*

Just as common as the preceding, and having the same distribution.

Family KINOSTERNIDÆ.

5. **Kinosternum louisianae** Baur. *Mudbox.*

Common throughout the state, especially in the flat and swampy sections.

6. **Aromochelys tristycha** (Latr.) Gray. *Stink-pot.*

Common throughout the state in the sluggish bayous and gum-swamps.

7. **Aromochelys carinata** Gray. *Musk Turtle.*

Occurring in the same localities as the preceding. Common.

Family EMYDIDÆ.

8. **Pseudemys concinna** Le Conte. *Florida Cooter.*

Common in the southern portions; rarer inland, excepting in or near large bodies of water.

9. **Pseudemys mobiliensis** Holb. *Mobilian.*

Common, but principally confined to the southern sections.

10. **Pseudemys alabamiensis.** *Alabama Terrapin.*

Fairly common; occurring especially along the eastern coast lines.

11. **Pseumdemys floridana** Le Conte. *Florida Terrapin.*

Like the preceding, chiefly inhabiting the bayous and lagoons of the southeastern parts of the state. It is fairly common.

12. **Pseudemys troostii** Holb. *Troost's Mobilian.*

Common in all parts of the state. I have seen as many as fifty-four large specimens taken from a single alligator hole.

13. **Pseudemys elegans** Prince Max von Neu Wied. *Mobilian; Cumberland Terrapin.*

This species is one of the most common of our turtles, and in suitable places is found in all parts of the state.

14 **Malacoclemmys centrata** Daud. *Salt-water Terrapin.*

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Common along the coast lines, especially in the salt-water marshes.

15. **Malacoclemmys kohnii** Baur. *Kohn's Terrapin.*

A species first described by Dr. Baur and named by him in honor of Mr. Gustave Kohn, of New Orleans. It is fairly common in the marshes of southwestern Louisiana.

16. **Malacoclemmys intermedia** Baur.

Like the preceding, it chiefly inhabits the southern and southwestern parts, where it is fairly common.

17. **Malacoclemmys pulchra** Baur.

I have only seen this and the following species in the collection of Mr. Kohn. It was obtained from Mermentau, La.

18. **Malacoclemmys oculifera** Baur.

A handsome species, occurring in the marshes of southwestern Louisiana, whence it is brought to the French Market, New Orleans, along with shipments of other turtles, and where Mr. Kohn secured the specimens in his collection.

19. **Chrysemys dorsalis** Agassiz. *Southern Painted Turtle.*

Another handsome species of fairly general distribution in the state west of the Mississippi. It is not common. I have only seen one specimen in Catahoula parish, and another on Brown's Bayou, in Franklin parish.

20. **Hirochelys reticulata** Bosc.

Not very common, but occurring in nearly every part of the state.

Family TESTUDINIDÆ.

21. **Terrapene major** Agassiz. *Box Turtle.*

Common in almost every section of the state, especially in low places in the pine regions.

22. **Terrapene triunguis** Agassiz. *Three-toed Box Turtle.*

Common in the marshes of the southern and south-western sections, replacing there, in a measure, *T. major.*

23. **Xerobates polyphemus** Daud. *Gopher.*

Common in the pine-wood sections, where they are captured in pits dug near their burrows, and into which they fall when in quest of food at night time.

Order CROCODILIA.

Family CROCODILIDÆ.

1. **Alligator mississippiensis** Daud. *Alligator.*

While still common in some localities, persistent persecu-

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tion has effectually exterminated this reptile in others, and not many years will suffice to render this once abundant creature a curiosity in our state. A twelve-foot alligator is already a curiosity, and the largest taken within the past twenty years was killed in Bayou Lafourche in July, 1884. It measured 14 feet 9 inches.

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II.

THE GREATER AGARICS, WITH SPECIAL REFERENCE TO THEIR POISONOUS AND NON-POISONOUS QUALITIES.

A. B. LANGLOIS.

(Communicated February 25, 1898).

To better understand the nature of an agaric or mushroom (also called "toad-stool" when supposed to be deleterious) let us take the common *Psalliota (Agaricus) compestris*, or meadow mushroom. This mushroom, found in nearly every part of the world, is well known to everyone, and is much valued as an article of food. It is the mushroom largely cultivated (particularly in France) and sold in cans by grocers under the name of "Champignon."

This agaric, as all others, has two stages in life: [1] The vegetative, also called *mycelium*, and [2] the fruiting stage, which is by far the most apparent, better known, and by many the only one known. This last, or fruiting stage, is what is commonly called the agaric.

MYCELIUM.

Mycelium is the aggregation of filaments resulting from the germination of the spores. These filaments, by prolongation or successive ramifications, multiply in the ground, or in some other nutritive element, take different forms, or get entangled in many ways. They may constitute an irregular and lax tissue, then called *filamentous mycelium*, or a compact tissue—*membranaceous mycelium*. If several filaments run together into kinds of cords, simple or ramified, it is termed *fibrous mycelium*, or yet form tubercles of different sizes or

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forms – *scleroid mycelium.* In color it is mostly white, but it may be yellow, red, or of some other shade. It is white in the common *Psalliota* [*Agaricus*] *compestris*, and called "Blanc de Champignon," or mushroom "spawn." It is sold under this name and used to fecundate a hill or bed.

The function of the mycelium is to furnish nutriment to the fungus. If we compare a phænogamic plant to an agaric, the roots, stem and branches represent the mycelium; the fruit, the agaric itself. In phænogams, the roots, stem or trunk and branches are the most prominent parts, while it is just the reverse in agarics.

RECEPTACLE.

The fruiting stage is what is popularly known as the agaric, and is called the receptacle by mycologists. It holds the hymenium or cellules upon which the spores are produced. Taking the common agaric for example, we see in it three distinct parts: [1] A stem, or stipe, supporting [2] a cap, or pileus, under which we have [3] the gills, or lamellæ. These three parts are found in all agarics, with but few exceptions. But there may be accessory parts present in some agarics and absent in others. Thus we see in *P. campestris* a ring, or annulus on its stem, which ring is not present in many other species.

As the generic and specific differential characters of the agarics are taken from the peculiarities and forms of the receptacle as a whole, or its different parts, it would be as well to briefly consider them in detail.

1. RECEPTACLE AS A WHOLE.

Agarics may grow on the most diversified ground. For instance: on manure; on decaying vegetable matter of every kind; on rotting or rotten wood; on the roots or barks of plants, or parasitic on other agarics. The agarics may be fleshy, membranaceous, putrescent and not reviving when dried up; or they may be more or less coriaceous, rigid, corky and reviviscent, i. e., after rain or humidity, taking a new lease of life, after having been dried or shriveled up as if they were dead. In the first case they are called "Molles," in the second "Tenaces."

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2. STIPE OR STEM.

The stipe or stem is said to be *distinct* when it can be easily separated from the cap, and *connate* or *confluent* when it cannot be so separated without breaking the tissue. It may be short or long, bulbous at the base, ventricose at the center, or equal throughout; also obconic, i. e., thicker at the summit than at the base. It may be solid, or hollow and fistulose, or stuffed with fibers or scales. Its exterior may be smooth or scaly, mealy or pilose, striate or sulcate. In general, the stipe is central to the cap, but in some cases it is excentric and lateral; then the agaric is said to be *excentric*. Sometimes there is no stipe; then the agaric is said to be *resupinate*, i. e., laying on its back.

The stipe may have a ring, which ring is the remnant of a partial veil covering the gills before the agaric is fully developed. This ring may be membranaceous, as in the case of *P. campestris*, or it may be formed of delicate fibers, like spider-webs. In this case it takes the special name of *cortina* [curtain].

Sometimes the base of the stipe is enveloped by a membrane called the *volva*, which is the remnant of a universal veil, completely enveloping the young agaric. During growth this veil is broken, one part being left at the foot, and constitutes the volva. The upper part is represented on the cap by warts or scales, which can be easily rubbed off. The presence of both ring and volva, or of the one or the other, is a very important character in the determination of the agaric.

3. CAP OR PILEUS.

The cap, or pileus is the most apparent portion of the agaric. It is called the *hymenophore*, inasmuch as it always bears the hymenium, upon which the spores are produced. This cap takes different forms. It may be hemispherical, conical, campanulate, or it may be applanate, reflexed, umbonate, umbilicate, cupulate or even infundibuliform, i. e., funnel-shaped Its surface may be smooth or villous, hirsute or squamose, virgate or rivulose. It may be more or less fleshy, or only thinly membranaceous. Its borders present important characters. They may be smooth or striate, even or sulcate; they may be straight, incurved or recurved, and they may be accompanied by the remnants of the partial veil.

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The cap may take every shade of color, from white to dark brown, but the color of the pileus is deceitful in several cases, as in the same species it may take quite different tints. The taste and odor of the cap, which are very peculiar in many cases, are also to be very carefully noted by the student in mycology, being very important characters.

4. GILLS OR LAMELLÆ.

Stevenson, an English mycologist, says of the gills that "no type in the vegetable world has shown greater diversity of form." These different forms are very important in the classification of agarics.

The gills may be equal in length, or they may be unequal; they may be simple or forked, or they may be anastomosed by veins or transverse plates. Furthermore, they may be wide or narrow; they may reach the stipe or not; they may be adnate to the stipe or run down it more or less. In some agarics the gills are thickly settled; in others more or less widely distributed. They are convex or ventricose in some, concave in others. The edge of the gills may be obtuse or sharp, entire or sinuate, crenulate or serrate, and, in a few cases, canaliculate lengthwise.

The color of the gills, which is very variable and often occasioned by the spores, is a very good character for the determination of genera and species.

5. HYMENIUM.

The hymenium is a set of cellules or cells covering both surfaces of the gills. Some of these hymenial cells *(basids)* have at their top from two to four little stalks *(sterigmata)*, each of which bears a spore, and among the basids can be observed larger sterile cells (*cystids*). To see to advantage these cells of the hymenium (basids, sterigmata and cystids) it is necessary to make a thin transverse section of the gill, and examine with the aid of a compound microscope.

6. SPORES.

The spores, or reproductive agents of agarics, are round or oval. Some are elongated and fusiform, while in some cases they are angular and stellate, i. e., more or less marked by small spines or protuberances. But the most important

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character upon which the primary divisions of the agarics have been made, is the color of the spores. This color is generally white, but it may be rose or pink, yellow or ochraceous, dark purple or black. It is generally very easy to get the spores of an agaric and thus see their color. Take a fresh mushroom, cut its stem, invert the cap on a sheet of clean paper. After a few hours a mass of spores will be deposited. The cap may be inverted on a glass slip for a short time, and the spores deposited thereon can then be examined with the microscope as to their form and shape.

THE POSITION OF AGARICS AMONG FUNGI, AND THEIR IMPORTANCE.

The agarics belong to the tribe or class called *Hymenomycetes*, which includes most of the larger fungi. The hymenomycetes are so called because they have an external hymenium bearing cystids and basids with sterigmata and spores. They are also termed *Basidiomycetes*.

The hymenomycetes are divided into two groups and six families, according to the position of the hymenium.

First Group.--Hymenium figurate.

1. **Agaricini.** Hymenium spread over the surface of the lamellæ, or gills.
2. **Polyporei.** Hymenium lining the interior of tubes or pores.
3. **Hydnei.** Hymenium clothing the surface of spines or protuberances of various forms.

Second Group.--Hymenium even.

4 **Thelephorei.** Hymenium horizontal, and mostly on the under surface.
5. **Clavarici.** Hymenium vertical, and produced all over the surface.
6. **Tremellini.** Hymenium superior. Gelatinous fungi.

Thus the agarics occupy the first rank among the Hymenomycetes, which, in turn, are to be ranked at the head of all the different classes of fungi.

Henri Baillon says of the family of agarics, that it is one of the most important of the vegetable kingdom, as to number of species [in the "Sylloge" of Saccardo 5760 species are described up to the year 1895*], or on account of the good or bad qualities of many of its members. Some species furnish the most nutritious food and the daintiest delicacies which can be found, while others are very poison-

*A fourth part of the "Sylloge," published in 1899, adds 4 new genera and 468 new species, bringing the number of species of Agarics described to 6228, distributed into 76 genera.--A. B. L.

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ous. The importance of agarics may also be gathered from the rapidity of their growth and their multiplicity. After a single night, cartloads of edible fungi might be gathered in woods and pasture grounds, when the surrounding conditions are favorable to their growth. It is the manna of the poor, and like the manna of old, divinely supplied to the Israelites in the Wilderness, it needs no money to buy it. It costs only the trouble to go around with a basket and gather the gift of God. But the great drawback is the possibility of making the fatal mistake of gathering the deleterious agarics in place of the good ones. Hence the importance of popular and wide-spread knowledge of the good or bad qualities of the mushrooms to be found around us. In 1896, while in France, I saw almost every morning, around St. Etienne, poor people [girls, women and old men], with their baskets or little carts, gathering the mushrooms in the neighboring meadows and woods. But I must say that several cases of poisoning by mushrooms had been reported in the papers of the locality. Therefore the greatest precaution should be taken in gathering the mushroom for the table, and only the agarics which are definitely known to be edible should be used. Happily, the poisonous agarics are less numerous than the edible ones, and many of them have some exterior signs of their bad qualities.

CLASSIFICATION OF AGARICS.

Several systems have been, or are proposed for the classification of agarics according as the opinions of mycologists differ in regard to the value of the different characters presented by the mushrooms. All of these systems of classification are, more or less, artificial, i. e., not representing entirely the natural affinities, which are almost impossible to define, because groups, genera and species are very near each other in some mutual characters, and still very different in some other peculiarities. Therefore any system must be, perforce, more or less artificial, and the best will be the one which comes nearest to Nature.

The classification of E. M. Fries, the celebrated Swedish mycologist, is, with but few unimportant changes, the one generally accepted at the present day. For the purposes of this paper I will follow the system as laid down by P. A. Saccardo, an Italian mycologist, on account of the high authority

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accorded his monumental work ["Sylloge Fungorum Omnium"] which classification comes very near to that of the illustrious Fries.

Saccardo has classed the agarics, known and described up to the year 1895, into 72 genera. These genera are firstly divided into 4 sections according to the color of their spores:

1. **Leucosporæ:**—Spores white or whitish, ...33 genera.
2. **Rhodosporæ**—Spores rose, red or salmon-colored, ... 10 genera.
3. **Ochrosporæ:** —Spores yellow, ochraceous or light ferruginous, ...13 genera.
4. **Melanosporæ:** —Spores dark purple, fuscous or black.....16 genera.

The principal sub-divisions bearing a recognized name are the following:

1. **Haplophyllæ:**—Including the agarics of the Leucosporæ whose gills have not their edge canaliculate or split.....29 genera.
2. **Schizophyllæ:** —Those of the Leucosporæ having gills canaliculate, split or appendaged..... 4 genera.

The 29 genera of the *Haplophyllæ* are further sub-divided into:

1. **Molles:**—Agarics soon decaying and putrescing,.....20 genera.
2. **Tenaces:**—Agarics not putrescing; reviviscent, ... 9 genera.

The *Melanosporæ* of the fourth section are sub-divided into:

1. **Pratellæ:**—Agarics whose spores are dark purpureous. The common mushroom belongs to this sub-division.
2. **Coprinariæ:**—Agarics whose spores are black or nigrescent.

Representatives of all of the above divisions or sub-divisions can be found [I speak from my own experience] in the state of Louisiana.

THE PRINCIPAL GENERA OF AGARICS.

Lepiota:—247 species belonging to the *Molles*.
Tricholoma:—252 species belonging to the *Molles*.
Clitocybe: —297 species belonging to the *Molles*.
Collybia: —251 species belonging to the *Molles*.
Mycena: —276 species belonging to the *Molles*.
Pleurotus:—265 species belonging to the *Molles*.
Marasmius:—378 species belonging to the *Tenaces*.
Lentinus:—247 species belonging to the *Tenaces*.
Cortinarius:—427 species belonging to the *Ochrosporæ*

The principal genera as to dignity of stature, and as having most of the edible or poisonous species, are:

Molles:—*Amanita*, (including *Amanitopsis*), *Lepiota*, *Armillaria*, *Tricholoma*, *Collybia*, *Pleurotus*, *Hygrophorus*, *Lactarius*, *Russula*, and *Cantharellus*.
Rhodosporæ:—*Pluteus* and *Entoloma*.
Ochrosporæ:—*Pholiota*, *Hebeloma*, *Flumula*, and *Cortinarius*.

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Melanosporæ:—*Psalliota*, [or *Agaricus* proper], *Hypholoma* and *Coprinus*.

SOME SPECIES OF AGARICS RECOGNIZED AS EDIBLE.

Mr. Thomas Taylor, Microscopist of the United States Department of Agriculture, gives a list of 92 edible species of mushrooms for the United States, but this number is certainly incomplete. I do not find in it *Lepiota morgani* neither *Pluteus cervinus*, which I know by my own experience to be not only edible, but very delicious. Constantin and Dufour in their popular work—"Nouvelle Flore des Champignons,"—mark 154 species of agarics known to be edible, and only 83 species recognized as poisonous, in a list of 1144 species. The remaining 907 species are either too small or too tough to be used as food, or are not yet well known in regard to their good or bad qualities, and are therefore to be classed as suspicious. There is, I think, no country where agarics are more used as food than in France. Hence the importance of the remarks of the French mycologists on the bad or good qualities of the different species.

Most of the 154 species marked edible by Constantin and Dufour can be found in the United States, and probably in Louisiana. In fact, Louisiana has a climate and soil very favorable for the growth of fungi, and it is to be expected that many species, both good, bad and suspicious, may be found within its limits.

I will speak in detail of only a few edible species which I have found here, and which I know to be wholesome from my own experience.

1. LEPIOTA MORGANI Peck.

The genus Lepiota is distinguished by having white spores and no volva or remnant of it at its foot, but having a manifest ring, mostly free. None of the Lepiota is known to be poisonous. *L. cepæstipes*, which I have met with several times in Louisiana, is, however, marked by Constantin and Dufour as poisonous, while Mr. Taylor puts it among his edible fungi, and gives a very good figure of it. [*Food Products*, II, Pl. 1, fig 5]. I dare not say who is right. The species is probably not so dangerous, but I would join J. Moyen. another French mycologist, in regarding it as suspicious, Once the Lepiotæ have been seen, it is very easy to distinguish them from any other genus of agarics. The only prob-

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able danger would be in confounding them with the Amanitæ, which have also a ring, and among which are some very poisonous species. But the Lepiotæ have no volva, while the Amanitæ have this feature more or less manifest. Hence the importance of this character (the presence or absence of the volva) in distinguishing a Lepiota from an Amanita. Many times the volva is concealed among the grass or in the ground; therefore it is recommended that the fungus be dug up in order to ascertain the presence or absence of this important feature. I mention this for the information of those who are unacquainted with agarics. Those who have a little experience will, at first sight, recognize a Lepiota from an Amanita by the general appearance of the fungus, which can hardly be expressed in words. I have noted that a quite ignorant person, when he has once seen or eaten a named species of mushroom and found it good, will, by a kind of instinct, recognize it even among a thousand others. It is only through carelessness, or too much confidence that mistakes are made. My digression is rather lengthy, but my excuse must be the great economic importance of the subject.

Lepiota morgani is an American form, and not known elsewhere. It looks very much like *L. procera*, another edible agaric which is generally distributed over the world, and which may probably be found in Louisiana. The species, when young, is covered with white flakes or scales which soon disappear, at least in part. The fleshy cap expands domelike, and is more or less covered with brownish scales. The gills are thickly settled, leaving a free space around the stipe. They are at first white and become more or less fawn-colored when matured or dessicated. The stipe is solid and thickens from the summit to the base. It is white and flocculose when young, becomes smooth and more or less brownish with age, and is furrowed lengthwise.

This fine fungus is not rare in Louisiana. I have found it toward the end of summer on the borders of woods, along grassy roadsides and in pasture grounds. I have often eaten it [stewed with meat or by itself], and found it very good. When very young the whole fungus can be cooked for the table, but when more fully developed the stipe has to be rejected as too tough and indigestible.

2. LEPIOTA NAUCINOIDES Peck.

This is another purely American form and a very fine one. It does not become as large as *L. Morgani*, and is softer

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and more slender in all its parts. It is one of the best agarics for the table. Mr. C. G. Lloyd, of Cincinnati, wrote to me recently that he had found this species even more delicious than the Common Mushroom *(P. campestris)* so universally relished. It much resembles another Lepiota *(L. naucina)* also edible, hence its name *(naucinoides)*.

I have found this species abundant in our rich, grassy pasture grounds. Its cap is white like its flesh. This cap is more or less umbonate; is more or less yellow at its summit, and covered with scales towards the border, which is striate. The gills are white, slowly changing with age to a dingy, pinkish brown. Stipe rather long, about equal; inside cottony; outside a little pubescent. Ring rather large; persistent and white.

This species might be confounded with its next neighbor, *L. americana*, also a native of America, as its name implies. This latter has the cap more covered with pinkish scales, which become redder with age or dessication Its flesh also becomes red when cut or bruised. But the most striking difference between *L. naucinoides* and *L. americana* is that the latter quickly turns alcohol red when soaked in it, while the former leaves it clear. I do not know, as yet, whether *L. americana* is edible or not, but I have often eaten *L. naucinoides* with great relish.

3. *CLYTOCYBE GYMNOPODIA Bull. (ARMILLARIA MELLEA Vohl.)

This edible species is said to be common throughout the world. It seems to be very variable, and its different forms

*Since the presentation of this paper I have received the following communication from Mr. C. G. Lloyd, of Cincinnati, to whom I had sent specimens:

"Your plant, Clitocybe gymnopodia is what Morgan has named Clitocybe monadelpha.

"It has an interesting history, and your determination has added another chapter to it. It was first collected from this country by Lea, about 1840, around Cincinnati (where it grows abundantly in the fall) and sent to Berkeley, who thought it was a Lentinus, and named it Lentinus cæspitosus. Morgan, without knowing this at the time, called it Clitocybe monadelpha.

"It is, as you note, a living image of Armillaria mellea, but it differs in its cespitose habits. Peck had it as a ringless A. mellea, and for many years would not concede Morgan's species; but in conversation with him last summer he told me he had found it growing, and recognized its specific distinctions. Until you mentioned it, I never saw it referred to Bulliard's Agaricus gymnopodius. Unfortunately I have not a copy of Bulliard's work, and cannot refer to his description and plate. I see Saccardo gives it as a synonym for Armillaria mellea, and if it is a white-spore species, it is undoubtedly a Clitocybe and will take precedence to Morgan's name.

"However, Fries (and I have more faith in Fries than any other mycologist who ever lived) referred Bulliard's plate to the Dermini (Ochrosporæ) and called the plant a Flumula. So the chapter is not closed yet, and cannot be until we are sure what the color of the spores of Bulliard's plant is." —A. B. L.

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have received different names. The form that I have met with abundantly is what the French mycologists term *Clytocybe gymnopodia*, [under the authority of Bulliard], in view of its naked foot or stem. The Clytocybe have no ring, and the absence of this feature is what distinguishes the genus from Armillaria. Moreover the Clytocybe have their lamellæ decurrent on the stipe—a feature present in the Louisiana specimens. Under these circumstances I think that our species is a true *C. gymnopodia*, and not *Armillaria mellea*. However the species in question is much like *A. mellea*, having the same honey color and the same esculent qualities.

This mushroom is found in abundance during autumn at the base of old stumps or on decaying roots. I have seen bunches of more than fifty mushrooms joined together at the base of their stipes. They are so prolific that immense baskets could be filled with them in quite a short while.

This species, though very variable in size,—in forms of cap, which may be umbilicate or applanate; in the gills, which are, more or less, decurrent; in the stipe being smooth or scaly—is, however, very characteristic, and resembles no other mushroom, and on account of its white spores it cannot be confounded with any pernicious fungus. Once well seen it is known forever. It is honey-colored, the gills being pale-whitish, turning subrufescent with age.

4. PLEUROTUS SAPIDUS Kalch.

This is an edible fungus as its name implies, and commonly known as "Champignon de Saule," or Willow Mushroom. It grows not only on dead willows, but also on other trees, in swampy woods, and after copious rains. It is a rather large mushroom; is found in Europe and is common in the United States—at least in Louisiana, where large quantities may be gathered from spring to late autumn, and even during our mild winters.

The genus Pleurotus belongs to one of the divisions of agarics called *Excentrici*, i. e., having an excentric stem, a lateral one, or none at all. It is distinguished by its white spores from the genera Claudepus and Crepidotus, which have decidedly colored spores, and which also belong to the *Excentrici*.

Pleurotus sapidus is, with us, generally white; rarely its cap takes a brownish or yellowish color when old or dessicated. The coarse gills are decurrent on the stipe when pre-

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sent, which stipe is more or less villous at the base. The mushroom is cespitose, i. e., several grow together and form bunches. Sometimes a single bunch is sufficient to furnish a full dish for the table. The base of the cap and stipe are to be rejected as they are rather too coriaceous, and might prove indigestible. There is no danger of confounding this species with any obnoxious fungi. *Pleurotus almarius*, *P. ostreatus*, *P. salignus* and *P. tessulatus* for which it might be taken are all edible fungi. It is therefore one of the safest mushrooms which can be proposed to the general public.

5. CANTHARELLUS CIBARIUS Fr.

This mushroom has been known to be edible from antiquity—hence its name *cibarius*. Stevenson says: "It is edible and delicious," and he adds, "it must have four hours of slow cooking." Constantin and Dufour term it "delicious." Moyen remarks: "Odeur très-agréable, comestible, estimé," and Saccardo "antiquitus inter fungus esculentos laudatus."

The genus Cantharellus belongs to the division of fungi having thick gills, which are fold-like, and obtuse at the edge. Their spores are white and their gills decurrent.

Cantharellus cibarius is egg-yellow all over; rarely pale or white. Its cap is truly fleshy and is most irregular. Its upper surface is convex, plane or depressed, and always smooth. The stipe is solid and thickened upwards [turbinate.] The gills are thick and narrow.

Care must be taken so as not to confound this excellent mushroom with its congener *C. auranticus*, the gills of which are deep orange-colored, thinner and more thickly settled, and its cap tomentose. This latter species is said to be poisonous, or at least suspicious.

In Louisiana, *Cantharellus cibarius* may be found fairly abundant in clear woods during summer.

6. PLUTEUS CERVINUS Schoeff.

Constantin and Dufour mark this fungus as *edible;* Moyen remarks of it: *edible, not much flavor.* Stevenson, whom I find non-committal, says of the Plutei in general that *none are edible*. However, I have several times eaten this mushroom, not only without any bad after-effects, but with much relish.

The genus Pluteus belongs to the section of Rhodosporæ, i. e., having red spores. Its stipe can be easily detached

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from the cap, has no volva and no ring; hence it is readily distinguished from all other genera of the Rhodosporæ.

Pluteus cervinus is a large fungus,—3 inches, or more, in height and breadth. It is common throughout the world; growing mostly on decaying wood. It is not rare in Louisiana during spring and summer. With us, the fleshy cap is generally pure white, but a smaller form has the cap quite brown. The gills are at first white, but soon become red, and readily shed their reddish-orange spores in abundance. On account of its large and regular form, its neat stature, and its red gills, it is one of the finest of the agarics. None of the Plutei is known to be poisonous, therefore the above species can be eaten without danger, although it has been pronounced by some mycologists as having little flavor. But tastes may differ.

7. PSALLIOTA (AGARICUS) CAMPESTRIS Linn.

This species is the best known of all agarics, and the most universally used for culinary purposes. It is extensively cultivated [especially in France] with profit, preserved in cans and sold by grocers under the name of "Champignon."

This fine mushroom, common throughout the temperate regions of the world, is more compact and not so large as *Pluteus cervinus*. Its gills are first white, turning to rosy red and becoming dark purple when fully matured. Its spores are also dark purple. It is shown by this last character to belong to the division Pratellæ of the Melanosporæ. It possesses a ring, has no volva, and has a stipe which can be easily detached from the cap, and by these three characters is well distinguished from all other members of the Pratellae which might be dangerous. Most of the species of Psalliota are edible.

It is useless for me to speak of the qualities of this excellent mushroom as they are known to everyone. I will only cite the *Encyclopædia Britannica*, which, under the article "Mushroom," gives the rather startling information that "There are few more useful, more easily recognized or more delicious members of the vegetable kingdom, than the common mushroom (*Agaricus* [*Psalliota*] *campestris*)."

These seven species of edible mushrooms, which grow abundantly in Louisiana, even if there were no others, which is not the fact, would be sufficient to furnish a nutritious and

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delicious food nearly the year round without cost or much trouble. The only thing required is to know each of them well, and to be always on the lookout that no bad stranger be mixed up with them.

In concluding this somewhat lengthy paper, I would recommend that a better and more popular knowledge be gained of the greater agarics, not only in regard to the species that are known to be poisonous, but of those which are edible. With this knowledge accidents will be avoided, and we can profit by the good things that Nature is placing around us.

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III.

REPORT ON A SMALL COLLECTION OF HYMENOPTERA.

E. FOSTER.

(Communicated February 25, 1898).

The accompanying list of Hymenoptera is presented, not from any merit it may possess in the way of recording rare species, but rather with a view to drawing the attention of our members to the rich field offered by this state to the student of insect life. The list is a comparatively small one, but the excuse offered for its meagerness is: that the collection was made in the course of about eight hours spent during the early days of July on the banks of the Mississippi, opposite Audubon Park, and thus within the limits of the city of New Orleans.

The list may be of some use to the student of the distribution of species, to which zoologists now seem to be paying more attention. For instance, the form *Trypoxylon excavatum* was first described by Smith [*] from Jamaica in 1856. In 1867, Packard [¶] recorded it from Cuba, but so far as I have been able to make out, there is no record of it having been taken within the limits of the United States, except in New York and Illinois. However, I may be mistaken in this, as the literature of the American species of the order is much scattered. *Sphex lauta* seems to be another rare form, although not an uncommon one in Louisiana. It was first described from Texas by Cresson [§] in 1872. *Polistes minor*

*Catalogue of Hymenopterous Insects in the Collection of the British Museum. Frederick Smith, M. E. S., London, 1856, Pt. IV, p. 380.

¶Revision of the Fossorial Hymenoptera of North America. A. S. Packard, Jr., M. D. Proc. Ent. Soc. Phil. 1867. Vol. VI, p. 414.

§Hymenoptera Texana. E. T. Cresson. Trans. Amer. Ent. Soc. 1872, Vol. IV, pp. 212-213.

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has been recorded from Texas and Cuba. It was not uncommon at the time of my visits, and its small paper nest was to be observed on many of the willows which clothed the bank of the river.

To the initiated, it will be apparent that my efforts were confined to the more conspicuous individuals of the order, and more especially to the section Aculeata, or stinging members. Such was the case. I was specially interested in what are popularly known as "digger wasps," which will account for their great predominance in the list. I have included but one species of ant—the conspicuous Carpenter Ant (*Camponotus pennsylvanicus* DeGeer)-although quite a number of species of Formicidæ and Myrmicidæ were observed. The Chrysididæ—those beautifully colored insects—were fairly common at the time, but I swept but one specimen [a male] into the net. Few of the larger of the Ichneumonidæ were observed, but of the smaller species many were quite common, and, had time permitted, the list of these extremely useful insects could have been much extended. In the majority of cases both sexes were secured, and in the case of Polistes, both males, females and neuters of all the species noted, with the exception of *P. minor*. Of the species of Apis and Bombus only neuters were taken.

There has been little done in a systematic way in this state towards working up the order, or even any section of it. Joseph Barabino seems to have collected in all orders about 1831. His collection [*] seems to have been submitted to Thomas Say for identification. Only one species of Hymenoptera is mentioned—*Sphex habena*, a new species. De Saussure collected in the vicinity of New Orleans and elsewhere in the state in the middle of the fifties, but his time seems to have been limited, as he was merely passing through on his way from Central America and Mexico. He seems to have confined himself to the Eumenidæ and Vespidæ, and the forms recorded from Louisiana are incorporated in his various works. Dr. R. W. Shufeldt, of the United States army, collected in the vicinity of the city during 1882 and 1883 [¶]. He seems to have paid attention to all the orders, and enumerates 27 species of Hymenoptera. Here and there, in the various synopses and monographs of families, are to be found records

*New Species of North American Insects, found by Joseph Barabino, chiefly in Louisiana. Complete Writings of Thomas Say on the Entomology of North America. Edited by John L. LeConte, M. D., New York, 1859, Vol. 1, pp. 300-309.

¶Observations upon a Collection of Insects made in the vicinity of New Orleans, La., during the years 1882 and 1883. Dr. R. W. Shufeldt, U. S. A., Proc. U. S. Nat. Mus., Vol. VII, 1884, pp. 331-338. (Washington, 1885).

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of individual species, but, so far I have been able to gather, nothing like a list of the order, as represented in Louisiana, has been attempted, with the exception of that of Shufeldt.

For the identification of part of the collection I am indebted to Mr. W. H. Ashmead [through Dr. L. O. Howard, of the Division of Entomology at Washington], and to whom I wish to tender my thanks, not only for the same, but for many other favors received.

Ichneumon trogiformis Cress.
Trogus obsidianator Br.
Mesotenus laticinctus Cress.
Chrysis parvula Fabr.
Camponotus herculeanus, var. pennsylvanicus De Geer.
Sphaeropthalma fenestrata St. Farg.
Sphaeropthalma occidentalis Linn.
Tiphia inornata Say.
Myzine sexcincta Fabr.
Scolia dubia Say.
Elis ephippium Say.
Elis plumipes Drury.
Elis quadrinotata Fabr.
Pompilus atrox Dahlb.
Pompilus americanus Beauv.
Pompilus maurus Cress.
Pompilus philadelphicus St. Farg.
Priocnemis unifasciatus Say.
Ammophila gracilis St. Farg.
Ammophila intercepta St. Farg.
Ammophila vulgaris Cress.
Pelopaeus cementarius Drury.
Chalybion cæruleum Linn.
Isodontia philadelphica St. Farg.
Isodontia tibialis St. Farg.
Sphex ichneumonea Linn.
Sphex lauta Cress.
Priononyx atrata St. Farg.
Tachytes distinctus Smith.
Tachytes elongatus Cress.
Sphecius speciosus Drury.
Bembex texana Cress.
Microbembex monodonta Say.
Monedula carolina Fabr.
Bembidula quadrifasciata Say.
Gorytes denticulatus Pack.
Hoplisus phaleratus Say.
Hoplisus rufoluteus Pack.
Nysson aurinotus Say.
Cerceris bicornuta Guér.
Cerceris fumipennis Say.

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Trypoxylon excavatum Smith.
Crabro obscurus Smith.
Crabro singularis Smith.
Eumenes fraternus Say.
Monobia quadridens Linn.
Odynerus annulatus Say.
Odynerus bidens Sauss.
Odynerus megæra St. Farg.
Ancistrocerus campestris Sauss.
Ancistrocerus quadrisectus Say.
Ancistrocerus saecularis Sauss.
Ancistrocerus tigris Sauss.
Polistes americanus Fabr.
Polistes annularis Linn.
Polistes bellicosus Cress.
Polistes canadensis Linn.
Polistes minor Beauv.
Polistes perplexus Cress.
Polistes rubiginosus St. Farg.
Vespa cuneata Drury.
Vespa carolina Drury.
Augochlora pura Say.
Megachile infragilis Cress.
Megachile pollicaris Say.
Xylocopa virginica Drury.
Bombus pennsylvanicus DeG.
Bombus separatus Cress.
Apis mellifica Linn.

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IV.

NOTES ON BIRD MIGRATION, 1898.

H. H. KOPMAN.

(Communicated May 27, 1898.)

An interesting feature of Louisiana Ornithology in connection with migration is the occurrence, late in the spring, of species that nest much farther north, or even above the United States boundary. During a visit to West Pointe-a-la-Hache, Plaquemines parish, from May 16-21 inst., I noted several instances of this in the case of water birds.

In the spring, the lower Louisiana marshes are swarming with blackbirds, and various species of mud-hens and rails that nest in the marshes, and many other birds that are simply transients are found with them, but at such late dates as those given above one would hardly expect to find these species still lingering, especially as the birds that make the marshes their home are through nest building, and some even are rearing their broods. Such, however, was the case. Everytime I went into the marsh I saw a certain flock of small sandpipers. There was no question about their identity, outside of two species—the Least and the Semi-palmated Sandpiper, with the probabilities greatly in favor of the former. In either case the late staying of these birds would be equally remarkable, as both species nest north of the United States, especially about Hudson's Bay, and in Labrador and northward, but the little fellows are rapid travelers, for some individuals return from their summer homes to the Gulf Coast by the middle of July.

Several Coots or "poule d'eaus" were seen, but we did not positively identify any flying, so those seen may have been

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wing-tipped, and hence, like many ducks, unable to migrate. This was very probably the case, as thousands of coots had wintered at the place, and many had been wounded.

Two small ducks, evidently Blue-winged Teals, fully manifested their ability to fly, however, so they were remaining late from preference. These ducks were seen May 17.

Though these were the only late emigrants noted on this occasion, the list of species that put off the evil day when the cares of housekeeping must be assumed, and still linger to enjoy the southern sunshine and bounteous supply of bird dainties while our summer residents are already rearing their young, could be considerably increased.

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V.

NOTES ON THE GENUS TELANTHERA.

R. S. COCKS.

(Communicated December 26, 1898.)

During the past season I have collected in different parts of Louisiana several hundred speciesofplants. Many of these, from their rarity or economic importance, or for other reasons, are, I think, worthy of occasional notes, which I can best present to the society, from time to time, in the form of communications.

The genus *Telanthera*, which I make the subject of a communication this evening, is, I believe, now for the first time reported from Louisiana. Heretofore it has been reported only from southern Florida, with the exception of one species from the coast of South Carolina. It is a small family, composed principally of tropical plants growing in water on the sea-coast. They belong to the same order as the showy "Cockscomb" of our gardens, and are near relatives to one of our most troublesome weeds—*Amarantus albus*, or "Pig-weed."

The flowers of all the species are in compact heads, both axillary and terminal, and all of them have ten anthers—five perfect, and five imperfect with elongated sterile filaments.

I have found three species in Louisiana, all of them in the vicinity of New Orleans. The first one, *Telanthera maritima*, which can be distinguished by its blunt leaves and short peduncle, deserves notice, for it shows some tendency to rival the celebrated Water Hyacinth [*Piaropus crassipes*] in choking up our bayous. There is a canal near Milneburg, which during the summer was completely filled by it. The second one, *Telanthera polygonides*, I found at the back of the City Park. I do not think it has ever been reported before from our

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state.* The third one *Telanthera phylloxeroides*, is supposed to be a native of South America, and to have been lately introduced into this country. It was first collected in 1894 in Cedar Keys, Florida, and has certainly never been collected before in Louisiana. As it has not yet been described in any of our manuals, a short description may not be out of place:

It is an annual, growing for the most part in water, partially submerged. It is upright or prostrate, rooting freely at the nodes. The leaves are opposite and sessile; lanceolate and acute at both ends; 2 to 3½ inches long. The shape of the leaves and habit distinguish it from *T. maritima*, which it resembles exactly in its flower. The flowers form a compact globose white head; the peduncle varies in length from half an inch to three inches. Sepals five, subtended by three bracts. Petals 0. Anthers 10, 5 perfect, 5 sterile, filaments flattened and fimbriate at the apex; Style short; Stigma capitate. Fruit: utricle indehiscent; *oneseeded*, included in the calyx. Seed vertical.

*I have since found that Dr. Hale collected T. polygonides in 1854, and published the fact at the time.--R. S. C.

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VI.

HISTORICAL SKETCH OF THE BOTANY OF LOUISIANA.

R. S. COCKS.

(Communicated February 3, 1899).

The earliest printed notice of the Flora of Louisiana seems to have been in the year 1758, by the historian Le Page du Pratz. In the first chapter of the second volume of his history of Louisiana he states that he had spent nearly sixteen years in the study of the plants and animals of Louisiana, and that he had made such progress in the botany of the state that he had sent to France a collection of three hundred medicinal plants worthy of notice in the form of a report to the French government. Whether this collection is still in existence I have been unable to discover.

Le Page du Pratz does not claim to have made an exhaustive study of the botany of the state, but to have confined his attention to such plants as were supposed to have an economic value. The first chapter of the second volume is on Grasses and Leguminous plants. He mentions several species of both, but rather of such as were found to flourish in the state, like corn and rice, than of species indigenous to the country. Chapter II is on fruit trees and enumerates a large number, both native and introduced.

Chapter III is on the forest trees, and contains notes on about fifty of our native trees and their uses. Chapter IV is a short description of a number of our native shrubs, and concludes with a short account of what he calls "Excressences," under which term he includes mushrooms and lichens. There is also a short description of *Tillansdia Usneoides*, which he calls

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"Barbe Espagnole," deriving its name from the strong resemblance which the Indians detected in it, to the beards of the Spaniards.

Chapter V is on climbers and other plants—their virtues and some flowers. Of the flowers he says that all kinds are so numerous that the perplexed collector cannot make up his mind which to take and which to leave behind when all are so beautiful, and that they bloom from May to December. All these chapters are copiously illustrated by quaint but rather perplexing pictures. Altogether this book, though exceedingly interesting from an antiquarian point of view, would not be of much practical use to the botanist of to-day.

The next published notice of any sort on the Botany of the State was in 1802. A little book was published, entitled "Travels in Louisiana," by a man named Davis. It is a translation from the French and contains a chapter "On the Trees of the Colony." It does no more than give the names of a few trees observed in the State.

In 1807 we have the first serious attempt to treat directly of the Botany of the State in a work entitled "Florula Ludoviciana," by C. C. Robin. This gentleman published in Paris, in 1807, in three volumes, his travels in Louisiana, West Florida and the West Indies, performed between 1802 and 1806. At the end of the third volume he inserted a "Flora of Louisiana" classed according to the method of Jussieu. He describes about four hundred species of plants, collected principally near New Orleans, of which one hundred and ninety-six were at that time new and forty-six were designated as useful. He also suggests several plants as worthy of cultivation in our gardens. His plants were made up as follows: Phanerogams 389, Fungi 7, Ferns 4.

In 1817 this book was translated into English, and enlarged and improved by Rafinesque. In his introduction he says: "Whoever shall have the opportunity of comparing my labors with the fragments of Robin will soon perceive the wide difference between our works. The numberless defects of his flora were of such a nature as effectually to preclude the possibility of its being practically employed by a botanist. I have endeavored to collect names and describe the objects which he had merely pointed out and generally drowned in useless and superfluous details."

He goes on to state that in order to render this "Florula" less incomplete he has added in a supplement an enumera-

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tion of all the plants already mentioned by authors as natives of the State of Louisiana and omitted by Robin.

These authors are principally Bartram, Michaux, Pursh and Muhlenberg. These additions bring up the number of plants known in Louisiana to 596. This little book may be fairly taken as summing up all that was known of the botany of Louisiana at that date.

In the same year, 1817, was published by William Darby, a work entitled "A Geographic Description of the State of Louisiana." This book contains a chapter on the "Vegetation Peculiar to Louisiana," but does not add very much to our knowledge of the subject.

In the year 1825 there was published in French a description of the United States by D. B. Warden. The article on Louisiana contains a list of the trees and shrubs of the state, 101 in number; also the plants used in medicine [4] and plants "good for the nourishment of beasts" [7]. A considerable number of these are not contained in the Florula Ludoviciana. The plants which he mentions as being medicinal are *Alisma odorata*, *Panax quinquefolium*, *Solidago odora* and *Prenanthes serpentaria*. The forage plants consist of three species of clover, one fern and two grasses, and also the wild strawberry.

From the year 1825 we have to pass over twenty-seven years to the year 1852, in which year was published in the New Orleans Medical and Surgical Journal of 1852 and 1853, a catalogue of the plants of Louisiana, by Prof. Riddell of New Orleans, Dr. Josiah Hale of Alexandria, and Prof. Carpenter of New Orleans. Prof. Riddell, who was professor of Chemistry in the University of Louisiana, is also famous as the inventor of the binocular microscope. These three gentlemen did great work as pioneers in the Botanical exploration of the state. Their catalogue contains the names of over 1500 species of flowering plants and thirty species of vascular cryptograms. Grasses and sedges are not included in this catalogue, but mention is made of an additional list of these groups by Dr. Hale, which I have not been able to find or hear anything of. In the introduction to the catalogue Riddell states that, "this list embodies the results of a great many years of observation by Dr. Josiah Hale, Prof. Carpenter and the author, and has been abridged from a work in manuscript, contributed by the author in 1851 to the Smithsonian Institution." The work alluded to is entitled "Plants of Louisiana."

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It comprises the technical and vulgar names of the flowering plants and ferns well ascertained as growing in the limits of Louisiana, with special localities, times of flowering and full descriptions of new species. The Cyperaceæ and Gramineæ, contributed by Dr. Hale, are not included in the present abridgement.

Again for a long period there seems to have been a lull in botanical work in Louisiana, until in 1863 appeared a book, entitled "Resources of the Southern States, Fields and Forests," by Francis Porcher, which contains a few notes on some Louisiana species but nothing of much importance. I might also have mentioned an article in the "American Journal of Science" of 1848 on Southern plants by Dickeson and Brown.

The next contributor to the Botany of Louisiana was Prof. A. Featherman of the State University at Baton Rouge. His collections were not very extensive compared with those of Riddell, and were confined principally to the vicinity of Baton Rouge. The results of his labors were published in three reports of the Botany of Louisiana in 1869, 1870 and 1871.

In 1871 the second edition of Alphonso Wood's Class Book of Botany was published. This book is of great assistance to students of the Botany of the State; for he tells us in the introduction that while he was working on the book, Dr. Hale sent him a set of specimens representing the Flora of Louisiana, and that descriptions of these are incorporated in his book.

Up to this date, 1871, Botanists in Louisiana had confined themselves almost entirely to flowering plants and ferns. The year 1887 introduces us to the pioneer worker in the cryptogamic botany of the State. In this year the Rev. A. B. Langlois, now of St. Martinville, La., an honored member of our society, published "A Provisional Catalogue of the Phanerogams and Cryptogams of Louisiana." This catalogue he tells us in the introduction, was the result of eight years collecting, principally in the neighborhood of Plaquemine parish.

It stands as a monument to the untiring zeal, industry and ability of its author. The list contains the names of 1194 phanerogamic plants, 22 vascular cryptogams, 103 species of mosses, 30 species of hepaticæ, 663 species of fungi. Many species of all these were new to science. While his catalogue of flowering plants is not so extensive as that of Riddell's, it contains a good many species not mentioned in the former.

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Contemporary with Father Langlois, was another very able and diligent botanist, Dr. Joor, for several years the curator of the Tulane museum. Though the greater part of his botanical work was done in Texas, he spent several years investigating the flora of Louisiana.

Through the kindness of Professor Trelease and Prof. J. B. S. Norton of the Missouri Botanical Gardens, I have been supplied with a catalogue of his collections. This collection which is now in the possession of the Missouri Botanical Gardens is not very large, as ill health and his professional duties at Tulane prevented his doing as much work in collecting as he would otherwise have done, but I find in it several plants not mentioned by any of the others. There is a very interesting account of his life and work in the Botanical Gazette of October 1898.

In 1892 in the Geological Survey of Louisiana, published at Baton Rouge, were two articles on the Botany of the state, one on North Louisiana, the other on South Louisiana.

The second one is by Prof. Dodson of the State University and Mr. Mathews, and gives a list of the principa. plants of economic value in the Florida parishes. It enumerates about three hundred plants.

The one on North Louisiana is by Mr. Thomas Wayland, and gives a list of trees and shrubs found and determined in North Louisiana. It enumerates about 200 species; also twenty medicinal plants and fifty-seven grasses.

During the last two years Prof. John K. Small of Columbia University has been publishing in the Torrey Bulletin, a series of "Studies in the Botany of the Southern States." In these studies are descriptions of a number of species from Louisiana. The author has very liberally presented the Society with a full series of these.

This I believe about ends the list of all the botanical workers in our State; of all those at all events who have published anything. If there are any whose names I have omitted I would be very glad to hear of them.

With this brief sketch I submit to the Society "A preliminary catalogue of the flowering plants and ferns of the state*." The grasses and sedges are not included in this but will be added at a later date. This catalogue may be taken as fairly well summing up the labors of all the earlier workers, and of

*Owing to the great number of additional species catalogued since the reading of this article, I have thought it advisable, with the concurrence of the Executive Committee, to postpone the publication of the check-list.—R. S. C.

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Riddell, Hale, Carpenter, Dr. Joor, and to a certain extent, the work of Father Langlois up to 1887. There are about 1800 plants enumerated. Of these I have collected myself something over three-fourths during the last two or three years, and have been enabled to add about sixty species to the lists of the others, which are recorded here for the first time as occurring in the state. Most of the remaining fourth can be found in the Tulane Herbarium. Those I have not seen are inserted upon the authority of Dr. Joor or taken from the 1889 catalogue of Rev. A. B. Langlois.

This catalogue is to be regarded as merely a preliminary one, to be followed at a later date by a more complete annotated one, in the preparation of which we hope to have the assistance of the Rev. A. B. Langlois who, from his long experience in the state and his wide knowledge of the subject, is far better prepared than any one else in the state for such a work.

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VII.

THE AVIFAUNA OF LOUISIANA.

GEO. E. BEYER.

(Communicated March 3, 1899).

Although the natural history of the birds of North America in general, as well as that of several of the individual states of our Union, has been well worked up time and again, no effort, so far as I have been able to ascertain, has been made to define the extent and distribution of feathered life within the limits of Louisiana, almost all material in ornithology pertaining to the state having been incorporated with other and more general works on the subject.

We find the earliest account of the bird-fauna of Louisiana in Le Page du Pratz's "Histoire de la Louisiane," published in Paris in 1758. This early historian of our state devotes a part of his second volume to an account of the plant and animal life as it appeared to him, an untutored naturalist. One chapter only treats, in a rather crude but quaint way, of the birds. His descriptions, of course, are not only faulty, and in many ways exaggerated, but his list falls far short of the number of species known to us at the present day.

Le Page only mentions and describes about 36 species, which he also endeavored to represent by illustrations. It was well that he had the forethought to furnish these illustrations with the names of the birds they were intended to represent. I am sure that the Parisians of the time must have been strongly impressed with the wonderful grotesqueness of the birds of Louisiana.

Notwithstanding the shortcomings of Le Page, we must certainly give him the credit of being, even up to this day, the only naturalist who has confined himself strictly to Louisiana in the treatment of his subject.

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The knowledge of bird-life in Louisiana remained confined to Le Page's limits until the present century was well advanced, for other historians either did not trouble themselves about it at all, or mentioned it only in a very desultory manner. It was not until a Wilson, and later still an Audubon appeared on the scene, and devoted their lives to the subject of ornithology, that we become more acquainted with the actual extent of this class of vertebrates in this country in general, and Louisiana in particular. The material collected in Louisiana by these two famous workers was incorporated by them in their comprehensive works on the birds of North America. The first—"American Ornithology," by Alexander Wilson, appeared in 1814; the second—"Ornithological Biography," by Audubon in 1838, which was subsequently enlarged in 1844 to the now famous "Birds of America."

Almost contemporaneous with Audubon's work, appeared "A Manual of the Ornithology of the United States," by Nuttall, of which two editions were issued; one in 1832, and the other in 1840. In 1872 appeared for the first time, "A Key to North American Birds" by Dr. Elliot Coues, and in 1884 "The birds of North America," by Baird, Brewer and Ridgway. All of these works contain references to records made in Louisiana, but no author appeared to emulate Le Page's example, except one, L. von Reitzenstein, who wrote and published during 1883 a number of articles under the title of "Birds of Louisiana," in the Sunday editions of the New Orleans Times-Democrat. As, however, these papers were intended more for the amusement of the subscribers to that newspaper, and the author permitted too many exaggerations and too much fiction to enter into the various biographies, his endeavors fell far short in value to be regarded as a work of scientific character and merit.

The literature on the ornithology of Louisiana is therefore wanting, and we are standing, in this respect, far behind the work accomplished in other states, as for instance: Long Island and New York, whose bird-faunas were published as early as 1844 by Giraud and DeKay respectively.

While Louisiana has, at times, possessed observers and collectors, ardent and accomplished enough to pursue their favorite study with fair success, they have, unfortunately, failed to publish the results of their work either in a satisfactory and systematic manner, or altogether.

The annexed catalogue of the birds of Louisiana is the result of personal observation and collecting during fully six-

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teen years within the limits of our state. In the pursuit of the study of ornithology I have visited nearly every section of the state at different seasons of the year, and in this way learned to understand the variation of bird-life effected by the annual spring and fall migrations. During the spring and summer months of 1886 I made the first extended tour, partly in a pirogue and partly overland, through the entire section covered by the parishes of St. James, St. John the Baptist, St. Charles, Jefferson, Orleans, Plaquémine and St. Bernard. In 1888, from the 8th April to the 28th July, I traversed on foot all parishes north of Lake Maurepas and Lake Pontchartrain, east of the Mississippi, with the exception of West Feliciana, establishing on this trip alone the records of 89 species, or over one-half of the breeding birds of the state. To enumerate other trips, more or less extensive, which were made during the following years would be too tedious and altogether superfluous.

The geographic location on the southern border of North America, and the semi-tropical climatic conditions of Louisiana fully account for the fact that at one period of the year or other, at least one third of the species of the entire avifauna of North America finds refuge within her precincts. The avifauna of North America is almost distinctly divided into three great sections: the eastern, or Atlantic; the western, or Pacific, and the middle, or Mississippi Valley section. Each is more or less distinct from the other in certain characteristics of individual species, and the boundaries of these three geographical sections are sharply defined by natural lines. Louisiana virtually presents the southern entrance and exit of the entire Mississippi Valley section, and nearly all those birds which the rigorous climate of the north compels to migrate are forced to pass, either through the state on their way to warmer climates north of the equator, or [as in the case of the majority] may be invited to seek and find secure winter quarters within her confines.

The physical conditions of Louisiana are peculiar, for the more elevated ground is principally on the banks of the rivers. The average elevation of the state is about seventy-five feet above sea-level, and the highest parts are not much over four hundred feet. Back from the rivers are extensive swamps, which drain the arable land, and the larger rivers flow through beds of alluvial soil, which, in width, may vary from one to forty miles. The maritime coast is low and marshy, lined in its fullest extent by chains of low, sandy, or sometimes marshy

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islands, and especially about the delta of the Mississippi by innumerable islets. The swamps extend inland from ten to nearly fifty miles, and the rivers or bayous often afford the only means of approaching the coast. Louisiana covers about 48,000 square miles, of which 1,050 are taken up by land-locked bays, 1,700 by inland lakes and more than 540 by river surface. This peculiar physical condition well accounts for the fact that not only one-half of the resident birds, but also the majority of winter residents are water birds.

The greater part of water-broken territory constitutes what we will call the southern portion of Louisiana, lying between the 29th and 30th degrees north. The western part of this section, between the 92nd degree and the Sabine river, is principally made up of prairie-lands, lined along the coast by salt-marshes. The eastern part, between the 92nd and 89th degrees, contains the greater part of the water-broken land, being excessively cut by rivers and bayous, which are often only secondary outlets for larger rivers or lakes, furnishing thereby the means of drainage in flood time. Of course, the entire southern section harbors, by far, the larger number of species of water-birds, either resident or migratory, to be found in the State, some of which are almost completely confined to the vicinity of the gulf waters.

Central Louisiana, between the 30th and 32d degrees north, presents a more varied topography. The southern half of this, including the whole of the parishes of Calcasieu, Acadia, Lafayette, St. Landry, St. Martin, Iberville and part of Avoyelles, Rapides and Vernon, is of a generally level conformation, excepting in a northwesterly direction, where it is hilly, and contains the outrunners of the pine and hard-wood forests of the remaining northern portion of central Louisiana.

The prairie regions of our state are unlike most of those of Texas and further west, devoid almost of wood and water, but are intersected by streams, along whose courses generally a very luxuriant growth of timber constantly exists. It is for this reason that the avifauna of the prairie regions, which, as far as the number of species is concerned, would be a very limited one, is greatly augmented by forms, which otherwise would be, more or less, restricted to the woods and highlands.

Northern Louisiana, between the 32nd and 33rd degrees north, and even the upper portions of central Louisiana, as far down as Red River Landing, is divisible into an upland and lowland section, Ouachita river being the dividing line.

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The lowland region, between the Mississippi and the Ouachita, is alluvial, and therefore of recent origin. It is the product of these two rivers as well as the Arkansas, and partially subject to inundation. Heavy cypress swamps along the numerous water-courses alternate with hummock lands, in both of which the majority of land birds find abodes, either temporarily or permanently. In the immediate vicinity of the banks of the Mississippi, however, quite a number of species of waders and swimmers, and among them even Terns, etc., also spend a large part of the year breeding and rearing their young. This part of the state, therefore, somewhat resembles in bird-life the coast line of the southern section.

Western, or rather north-western Louisiana, between the Ouachita river and Texas boundary, contains some of the highest parts of the state; the vegetation consisting of both pine and hard-wood timber, the former, however, predominating. The highland is, however, in some parishes greatly broken up by numerous large lakes, which drain into Red river. This applies especially to Caddo, Bossier, Bienville and De Soto parishes. In many respects the avifauna here corresponds to that of the Florida parishes, augmented, of course, by more western forms.

The so-called Florida parishes, which now remain to be considered, constitute the entire section of the state between the 30th and 31st degrees north, and between the Mississippi and Pearl rivers, east and west, respectively. The topography of these parishes combines the physical aspects of the rest of the state already considered, with the exception of the prairie lands, and, possibly, the salt-water marshes, for the latter are only represented in a modified degree along the borders of lakes Maurepas, Pontchartrain and Borgne. Along the courses of streams only alluvial lands with heavy cypress and other timber exist, while nearly all the rest is taken up, either by pine-flats or pine-hills, the latter extending in a north-easterly direction; the former occupying the central and southern parishes.

The highlands of north-western Louisiana are represented in East Feliciana alone, and this peculiarity has also been recognized by a few species of birds, which have made this parish their breeding place in the state, east of the Mississippi river.

The result of this varied topography of the Florida parishes is: that with the exception of a comparatively small

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number of species, nearly every bird belonging to the Mississippi Valley section may be found within their precincts at one time or other of the year.

Before entering into a discussion of the birds of our state themselves, it will yet be necessary to speak of some points of migration, without considering the reasons which originally prompted birds to change their home locations, and return to them with such exactness and regularity. These reasons, I believe, are already well known, but the two movements which occur in the yearly cycle of migration are so characteristically different from each other that they are deserving of some attention. It is certainly fair to assume that the locality where a bird raises its young should be regarded as its true home, whence, however, it may be driven by external influences, against which it cannot combat. That the leaving of the beloved spot, where its conjugal and parental pleasures found their culmination, must be reluctant is self-evident; hence the gradual and dilatory movements during fall migration. Inch by inch and mile by mile, as it were, the birds are driven from the vicinity of their homes, until finally, through the ever increasing rigor of climatic conditions and the diminishing food supply, they are compelled no longer to postpone the long deferred journey to distant and more congenial lands. This, I think, is the reason that, with few exceptions, migratory birds are spread over a larger area, and remain in greater distribution for a longer period during the autumn migration. It is well known to everyone who has studied the habits and peculiarities of birds how quickly the migrant can be told from the resident of the same species. The resident is at home; the migrant, on the contrary, ill at ease, and ever restless and silent. With the change of season, the delay of these more widely scattered fall migrants is no longer indulged in. The love of home becomes the all-prevailing desire, and although storms encountered on their journey may drive them back again, they only push forward with renewed vigor, and nothing short of death will deter them from again reaching their nesting places.

Along our coast-line there are various stopping places where, after a long and uninterrupted journey, the tired and worn birds remain for a few days to recuperate. They appear there from a week to ten days earlier than they will be noticed twenty-five or thirty miles further inland. Grand, Timbalier, Last and Avery's Islands afford the fatigued travelers the needed rest, and while many species and indi-

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viduals pass them without stopping during fall migration, these same birds are sure to avail themselves of their hospitality on their homeward journey at the end of winter and at the expiration of their enforced exile. Of course these remarks do not apply to all migrants, for there are some species which are laggards in all their movements, and others which are altogether too erratic, and which will postpone the fulfilment of parental duties as long as possible, as for instance: the Cedar-bird (*Ampelis cedrorum* Viell.), which does not commence breeding until nearly all other birds are nearly, or altogether through with it.

According to the length of time of the year during which a species remains within certain boundaries it may be referred to one of five divisions. The avifauna proper of a state, however, consists of such birds which not only breed within her precincts, but also remain throughout the remainder of the year not occupied by parental duties. These birds constitute the "Residents."

The second division is made up of such species which, while they breed in the state, are not able to stand the changes of temperature, and whose food-supply becomes exhausted (or at least diminished) and are forced to migrate to warmer climates. Such birds are "Summer Residents." Others again, which only pass the winter but breed in another locality, are regarded as "Winter Residents," and belong to the third division.

If, however, birds neither breed nor winter, and only remain for a short period in spring and autumn, they are considered as "Migrants."

The fifth, and smallest proportion of the birds of a state, is made up of casual and rare visitors, which occur in limited numbers, or even singly once in a while, and upon whose movements within the locality no reliance can be placed.

Since, however, the instinct of migration is so strongly and permanently established in birds, and their powers of locomotion so adequately developed, no positive statement of occurrence or permanent record of the number of species for any given locality can be made, and even a hypothetical list, in which considerable latitude can be allowed, may be surpassed at any time.

American ornithology (relating, of course, only to carinated birds) is divided into eighteen orders. Seventeen of these occur in the United States and Canada; the *Sphenisci*,

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containing but one family—the Spheniscidæ, or Penguins, and belonging to the southern hemisphere—being absent.

Two orders only—the *Tubinares* and *Odontoglossæ*—are missing in Louisiana, for I consider it doubtful whether the sole representative of the latter (the Flamingo) may be found in our state. There are, so far at least, no records, and those which have of late been sprung upon the ornithological world are lacking in proof, and come from observers apparently very little inclined towards scientific truth.

The remaining fifteen orders are represented by 54 families, with 190 genera and 323 species. Of these 323 species, 103 are residents, 101 winter residents, 47 summer residents, 57 migrants and 15 casual, or rare visitors.

To this total of 323, nearly 40 species should be added as likely to occur, either regularly or casually, for while we have, so far, no authentic records, the range of some species is such an extensive one that it may reach into our limits. Some species are known to be common within a few miles of our state lines, as, for instance: the Prairie Warbler (*Dendroica discolor* Viell.) which is fairly numerous at Ariel, Miss. The topography of Louisiana in that vicinity is identically the same, and it naturally follows that the bird should be just as common in our state. It appears to me in this case, but an oversight on my part in not having observed or taken it, and I have therefore included it in my list.

Both divisions—the eastern as well as the western—may help in future to swell our list; in fact, from the latter quite a number of species are reported as having been noted or taken in Louisiana, but, unfortunately, some of these records cannot be trusted, and I have therefore refrained from including them in the catalogue. Of course, if birds are naturally close neighbors to a locality to which they do not belong, it cannot be anything unusual for them to occasionally extend their habitat, but, on the other hand, the appearance of those, which are either extreme eastern or western forms, in a place far removed from their usual haunts, becomes a matter of some importance and interest, as, for instance: the occurrence near New Orleans of the Wheatear (*Saxicola œnanthe* Linn), which is really a European, or at least an extreme North American non-migratory species. We must, in such a case, at once ask how this single bird safely traversed the long distance between Greenland and this point. Other birds, it is true, do the same, but they are regular migrants, used to their voyages by inheritance and experience, and while

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they travel, do so in company with others of their kind. This solitary visitor, however, had neither guide nor the protection which is afforded by numbers. When found the bird did not appear very shy, but was rather contentedly hopping around and feeding. The Surf Duck, or Scoter *(Oedimia perspicillata L.)* and the White-winged Scoter *(O. deglandi* Bonap.) are also unusual visitors, but these species have been known to extend their migration as far as St. Louis, and really belong to the northern Mississippi Valley section.

I have omitted from my list a number of sub-species, which have, as yet, either not been recognized as such, or whose identity depends upon such hair-splitting characteristics as, in my opinion, do not entitle them to the dignity of such.

In the preparation of the annexed catalogue I have been greatly assisted by Mr. Gustave Kohn, Mr. H. H. Kopman and Mr. Andrew Allison, all of New Orleans, and to whom I extend herewith my sincere acknowledgement and appreciation.

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ANNOTATED LIST OF THE BIRDS OF LOUISIANA.

WATER BIRDS.

A—SWIMMERS.

Order PYGOPODES.

Family PODICIPIDÆ.

1. **Colymbus auritus** Linn. *Horned Grebe.*

A winter visitor on the coast; rarer on our inland waters.

2. **Podilymbus podiceps** Dinn. *Pied-billed Grebe; Hell-diver; Dabchick.*

Resident and breeding in many sections, but more common on all waters during winter. It arrives in Louisiana as migrant at the end of October, and transients leave in March and April.

Family GAVIIDÆ.

3. **Gavia imber** Linn. *Loon.*

A winter resident; common on Gulf waters; rarer inland.

Order LONGIPENNES.

Family LARIDÆ.

4. **Larus argentatus smithsonianus** Coues. *American Herring Gull.*

Very common during the fall and winter along the coast and on all lakes of the southern portion of the state.

5. **Larus delawarensis** Ord. *Ring-billed Gull.*

Very common during the fall and winter, and frequenting the same localities as the preceding.

6. **Larus atricilla** Linn. *Laughing Gull.*

A common resident; breeding on the islands along the coast. It is the only gull which may be met with on the in-

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land bayous of the northern and northwestern parts of the state. I met with it August 22, 1896, near Columbia, on the Ouachita river.

7. **Larus franklinii** Sw. & Rich. *Franklin's Gull.*

A regular but not abundant winter resident on the western Gulf coast, as far east as the mouth of the Mississippi.

8. **Larus philadelphia** Ord. *Bonaparte's Gull.*

A winter resident; arriving in the southern part of the state as early as September, leaving again in April.

9. **Gelochelidon nilotica** Hasselq. *Gull-billed Tern.*

A resident along the western coast and breeding on the islands, but rarely coming far inland. One specimen offered for sale in the French Market, New Orleans, March 12, 1889.

10. **Sterna caspia** Pallas. *Caspian Tern.*

A common resident in many localities on the Gulf coast.

11. **Sterna maxima** Bodd. *Royal Tern.*

One of the commonest terns of the state; breeding in all suitable localities on the coast; appearing inland towards the end of summer, when it is exceedingly common on lakes Pontchartrain, Maurepas, etc.

12. **Sterna sandwichensis acuflavida** Cabot. *Cabot's Tern.*

A common but not an abundant resident in the same localities as the preceding species.

13. **Sterna forsteri** Nutt. *Forster's Tern.*

Very common in most parts of the southern section of the state. It is, however, more or less a migrant; more numerous during the early fall months than at any other period of the year. One was taken as early as July 2, [1896] in Plaquemine parish.

14. **Sterna antillarum** Less. *Least Tern.*

An abundant resident in Louisiana; breeding in all suitable places along the coast.

15. **Sterna fuliginosa** Gmel. *Sooty Tern.*

A common resident wherever the preceding species occurs.

16. **Hydrochelidon niger surinamensis** Gmel. *Black Tern.*

A migrant only; very common, however, during migration.

17. **Anous stolidus** Linn. *Noddy.*

A handsome and not uncommon resident of the islands of the coast.

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Family RYNCHOPIDÆ.

18. **Rynchops nigra** Linn. *Black Skimmer.*

A common resident on the coast.

Order STEGANOPODES.

Family SULIDÆ.

19. **Sula sula** Linn. *Booby.*

Of this species only a few notes have been taken, although its frequent occurrence is not at all unlikely. Two specimens (males) were shot during September, 1884, on the Mississippi, about fifty miles below New Orleans.

20. **Sula bassana** Linn. *Gannet.*

An occasional winter resident. It has been shot several times at the Rigolets (a male, December 9, 1886).

Family ANHINGIDÆ.

21. **Anhinga anhinga** Linn. *Snake-bird; Water Turkey; Anhinga.*

A common resident in most parts of the state wherever large bodies of water, fringed with trees, exist.

Family PHALACROCORACIDÆ.

22. **Phalacrocorax dilophus** Sw. & Rich. *Double-crested Cormorant*

A winter resident only; not at all common.

23. **Phalacrocorax dilophus floridanus** Aud. *Florida Cormorant.*

Common along the Gulf coast; breeding wherever it occurs

24. **Phalacrocorax mexicanus** Brandt. *Mexican Cormorant.*

A very common resident in several sections of the state.

Family PELECANIDÆ.

25. **Pelecanus fuscus** Linn. *Brown Pelican.*

Very common along the Gulf coast as well as on the lakes; breeding in large numbers on the Mississippi delta and the islands.

26. **Pelecanus erythrorhynchus** Gmel. *American White Pelican.*

A winter resident only; arriving in October and leaving during the latter part of February.

Family FREGATIDÆ.

27. **Fregata aquila** Linn. *Frigate-bird; Man-o'-war bird.*

A resident of the high seas, it breeds on the Gulf coast, but during heavy storms is frequently blown far inland.

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Three were shot on August 19, 1888, almost in the heart of the city of New Orleans.

Order ANSERES.

Family ANATIDÆ.

28. **Merganser americanus** Cass. *American Merganser.*

A winter resident and fairly common on the coast; rarely staying for any length of time on our inland waters.

29. **Merganser serrator** Linn. *Red-breasted Merganser; Bec scie de Mer.*

A winter resident only, and like the preceding, preferring the vicinity of salt water during its sojourn in the state.

30. **Lophodytes cucullatus** Linn. *Hooded Merganser; Bec scie.*

A very common winter resident. A few may even breed in the state, particularly in the south-western section.

31. **Anas boschas** Linn. *Mallard; Canard Francais.*

Probably the best known of all the ducks. It is a regular winter resident in almost every part of the state; arriving in November, and leaving at the end of February or beginning of March.

32. **Anas obscura** Gmel. *Black Mallard.*

A winter resident only. It is fairly common but often confounded with the following species;

33. **Anas fulvigula** Ridgw. *Florida Duck; Canard des Isles.*

A constant resident; breeding on the Gulf coast.

34. **Chaulelasmus streperus** Linn *Gadwall; Gray Duck; Canard Gris.*

A very common winter resident.

35. **Mareca americana** Gmel. *Bald-pate; Zin-zin.*

Common in winter.

36. **Nettion carolinensis** Gmel. *Green-winged Teal; Congotte.*

An abundant winter resident; arriving towards the middle of October and leaving early in March.

37. **Querquedula discors** Linn. *Blue-winged Teal; Sarcelle.*

Like the preceding, a winter resident only, but not as abundant; the bulk evidently going farther south, whence they return late in the spring (May 17 and 21, 1898), and are then known under the name of "Printanières."

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38. **Querquedula cyanoptera** Viell. *Cinnamon Teal.*

Exceedingly rare. A pair were shot opposite Pointe-à-la-Hache in December, 1884. Another pair were killed during November, 1896, on Lake Catawatchie.*

39. **Spatula clypeata** Linn. *Shovel-bill; Micoine.*

A common winter resident.

40. **Dafila acuta** Linn. *Pin-tail; Paille en queue.*

Very common in winter.

41. **Aix sponsa** Linn. *Wood Duck; Branchu.*

An abundant resident in almost every part of the state; breeding wherever it occurs.

42. **Aythya americana** Eyt. *Red-head; Violon.*

A common winter resident, more especially in the southern sections.

43. **Aythya vallisneria** Wils. *Canvas-back; Canard Cheval.*

A common winter resident. Like the preceding species, it prefers the Gulf coast to more inland waters.

44. **Aythya marila** Stejn. *Blue-bill; Dos gris de Mer.*

A winter resident; principally on the Gulf coast.

45. **Aythya affinis** Eyt. *Lesser Scaup; Dos gris.*

One of the commonest of our winter residents.

46. **Aythya collaris** Donov. *Black Duck; Ring-Neck; Canard noir.*

An abundant winter resident, especially on the Lake and and Gulf shores.

47. **Glaucionetta clangula americana** Bonap. *Golden Eye.*

A winter resident, but not common. One was seen by Mr. H. H. Kopmann on May 5, 1896, and another [a female] was shot on June 15, 1894, by Mr. A. B. Blakemore, on Cat Island, off the coast of Mississippi, and only a few miles east of Louisiana.

48. **Charitonetta albeola** Linn. *Butterball; Buffle-head; Marionette.*

A common winter resident.

49. **Clangula hyemalis** Linn. *Long-tailed Duck; Old Squaw; Cowheen.*

An accidental visitor. During the excessively cold weather of 1899, accompanied by severe snow-storms, a male in full winter plumage was shot on Bayou Barataria, about twenty miles west of New Orleans, February 13. Fortunately the duck was preserved, and is now in the museum of Tulane University.

*A male, in almost full plumage, was obtained on Lake Borgne during January, 1900. It is now in the collection of Tulane Museum.--G. E. B.

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50. **Oidemia perspicillata** Linn. *Surf Scoter.*

A rare winter visitor, A male was shot on Bayou St. John, near New Orleans, March 20, 1890. The specimen was mounted, and is now in the collection of Mr. Gustave Kohn, of New Orleans.

51. **Oidemia americana** Sw. & Rich. *Black Scoter.*

An accidental visitor. It has been taken near Lake Catherine. A specimen is in the possession of Mr. Kohn.

52. **Oidemia deglandi** Bonap. *White-winged Scoter.*

An occasional winter visitor on the Gulf coast; rarely going inland.

53. **Erismatura jamaicensis** Gmel. *Ruddy Duck; Marteau.*

A very common winter resident.

54. **Chen caerulescens** Linn. *Blue Goose.*

A common winter resident along the Gulf coast.

55. **Chen hyperborea** Pall. *Lesser Snow Goose.*

An abundant winter resident on the coast.

56. **Chen hyperborea nivalis** Forst. *Greater Snow Goose.*

While not as common as the preceding, considerable numbers pass the winter on the coast. I have seen them as far west as Vermillion Bay, when they were traveling east (January, 1894).

57. **Anser albifrons gambeli** Hartl. *American White-fronted Goose.*

A winter resident. It generally arrives and departs with the Snow geese.

58. **Branta canadensis** Linn. *Canada Goose.*

Like the preceding species in its migrations, it is one of the commonest of all geese in the New Orleans markets during the winter.

59. **Branta canadensis hutchinsii** Sw. & Rich. *Hutchin's Goose.*

A winter resident; common on the coast.

60. **Branta bernicla** Linn. *Brant.*

An occasional winter visitor.

61. **Dendrocygna fulva** Gmel. *Fulvous Tree Duck.*

To my knowledge, only an occasional visitor in the early fall. Several large flocks appeared on Lake Catharine during October, 1892, when a number of them were shot.* Several other reports have been received from various places along the coast.

*This species was again taken in January, 1900, at the Rigolets.—G. E. B.

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62. **Olor columbianus** Ord. *Whistling Swan.*

A winter visitor. Of late years reports of the occurrence of this and the following species have become rare.

63. **Olor buccinator** Rich. *Trumpeter Swan.*

Of the two swans, this species is the commoner, especially on the marshes of the Mississippi delta.

B—WADERS.

Order HERODIONES.

Family PLATALEIDÆ.

64. **Ajaja ajaja** Linn. *Roseate Spoonbill.*

A resident only in the southwestern portion of the state, chiefly in Calcasieu and Cameron parishes, where it is a common breeder, according to Mr. McIlhenny, who has collected there numerous specimens and eggs. Two young ones, in immature plumage, were shot in December, 1884, on the Mississippi river, about five miles below New Orleans.

Family IBIDIDÆ.

65. **Guara alba** Linn. *White Ibis.*

A common resident in Louisiana, especially in the southwestern section.

66. **Guara rubra** Linn. *Scarlet Ibis.*

I have never seen this species in the state, although it is not unlikely that it occurs. All reports, so far, will, I think, bear verification.*

67. **Plegadis autumnalis** Hasselq. *Glossy Ibis.*

A resident in the same sections as the Roseate Spoonbill, but not as common as the following species.

68. **Plegadis guaranna** Linn. *White-faced Glossy Ibis.*

Resident and breeding in southwestern Louisiana. I noticed several small flocks on Lake Prieu, Calcasieu parish, during September, 1898.

*I have included this species in the general list more on the authority of Audubon, otherwise it should really be placed in the hypothetical list.—G. E. B.

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Family CICONIIDÆ.

69. **Tantalus loculator** Linn. *Wood Ibis.*

A resident in many parts of the state, it has, however, entirely disappeared from certain localities, where, a few years ago, it was abundant.

Family ARDEIDÆ.

70. **Botaurus lentiginosus** Montag. *Bittern; Garde-soleil.*

Resident in limited numbers, but very common as a winter resident.

71. **Ardetta exilis** Gmel. *Least Bittern; Shyte Poke.*

An abundant resident in all marshy sections of the state.

72. **Ardea herodias** Linn. *Great Blue Heron; Poor Joe.*

A resident in all marshy localities, especially along the coast and on the borders of the lakes.

73. **Ardea egretta** Gmel. *Great White Egret.*

An abundant resident in all marshy sections.

74. **Ardea candidissima** Gmel. *Snowy Egret.*

Once exceedingly common, and breeding in large colonies in all swampy parts of the state, this species has been nearly exterminated of late years.

75. **Ardea rufescens** Gmel. *Reddish Egret.*

A common resident along the coast during summers in the southern and southwestern parts, but, like the following, it is more or less migratory in fall and winter.

76. **Ardea tricolor ruficollis** Gosse. *Louisiana Egret; Louisiana Heron.*

A summer resident in the same localities as the preceding.

77. **Ardea cœrulea** Linn. *Little Blue Heron.*

The most common of all the Herons. A summer resident; occurring in all suitable localities and in almost every section.

78. **Ardea virescens** Linn. *Green Heron; Cap-cap.*

An abundant summer resident almost everywhere in the state.

79. **Nycticorax nycticorax nævius** Bodd. *Black-crowned Night Heron; Gros bec.*

A common resident; breeding in the state.

80. **Nycticorax violaceous** Linn. *Yellow-crowned Night Heron.*

Exceedingly common in summer in marshy localities; breeding in large numbers.

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Order PALUDICOLÆ.

Family GRUIDÆ.

81. **Grus americana** Linn. *Whooping Crane.*

Common along the coast during winter

82. **Grus mexicana** Muell. *Sandhill Crane.*

A resident along the coast, where it occurs in large numbers.

Family RALLIDÆ.

83. **Rallus Elegans** Aud. *King Rail.*

An abundant winter resident, and much esteemed as a game bird.

84. **Rallus crepitans** Gmel. *Clapper Rail.*

A very common resident in the salt marshes; breeding wherever found.

85. **Rallus crepitans saturatus** Ridgw. *Louisiana Clapper Rail.*

A resident in the salt marshes of the coast; so far, however, only a few specimens have been secured, the species having only been established within little more than ten years.

86. **Rallus virginianus** Linn. *Virginia Rail.*

A common winter resident; arriving from its breeding places rather late in the fall. It leaves the southern section of Louisiana about the end of March.

87. **Porzana carolina** Linn. *Carolina Rail; Sora.*

Like the preceding, a common winter resident; arriving, however, much earlier in the fall, but departing in the spring about the same dates.

88. **Porzana noveboracensis** Gmel. *Yellow Rail; Rice-field Rail.*

Rather a common fall and winter resident throughout the rice-producing sections, especially along the Mississippi, where hunting dogs very frequently catch them alive.

89. **Porzana jamaicensis** Gmel. *Black Rail.*

Notwithstanding continuous efforts made during the last sixteen or seventeen years, I have never obtained this species, although it undoubtedly occurs in Louisiana. Wherever it does occur, it is not apt to be overlooked. Throughout Central America it is very common, and I have very often obtained four and five in a single morning hour.

90. **Ionornis martinica** Linn. *Purple Gallinule.*

One of Louisiana's handsomest birds. It is an abundant resident in all marshy sections; breeding wherever it occurs.

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91. **Gallinula galleata** Licht. *Florida Gallinule; Ralle Poule d'eau.*
Common resident; breeding principally in the southern sections.

92. **Fulica americana** Gmel. *Coot; Poule d'eau.*
An abundant resident. It is not unlikely that a few remain throughout the year and breed. I have seen them in small flocks on Lakes Salvador and Catawatchie, as late as April 26, evidently as much at home as ever.*

Order LIMICOLÆ.

Family PHALAROPODIDÆ.

93. **Phalaropus tricolor** Viell. *Wilson's Phalarope.*
Rather an unusual migrant in spring.

Family RECURVIROSTRIDÆ.

94. **Recurvirostra americana** Gmel. *Avocet.*
A migrant only. I have shot but one specimen [a female, November 12, 1889], on Bayou St. John, near New Orleans, almost on the identical spot where Audubon obtained one of his specimens.

95. **Himantopus mexicanus** Muell. *Black-necked Stilt.*
A resident in some sections of the state; more generally distributed during the fall and winter, and occurring then in localities where it does not breed.

Family SCOLOPACIDÆ.

96. **Philohela minor** Gmel. *Woodcock.*
Very common during winter in suitable localities, and breeding in isolated places in various sections of the state. I found them mating in the middle of January, 1890, a few miles from Madisonville, and on January 29th, of the same year my dog retrieved a young one, but a few days old, near Covington. It is very common in winter on Avery's Island.

97. **Gallinago delicata** Ord. *Wilson's Snipe.*
An abundant fall and spring resident, migratory, however, during winter, and not returning until the end of February, when it remains in large numbers until April.

98. **Macrorhamphus scolopaceus** Say. *Long-billed Dowitcher; Dormeiul.*
An abundant winter resident along the coast and in other suitable localities.

*Mr. Kopman has seen them still later (May 18, 1898,) in Plaquemine parish.--G. E. B.

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99. **Macrorhamphus griseus** Gmel. *Red-breasted Snipe.*

A winter visitor; often associating with the preceding.

100. **Micropalama himantopus** Bonap. *Stilt Sandpiper.*

This species occurs only as a migrant and in limited numbers. While in Louisiana, it generally associates with other more numerous Sandpipers.

101. **Tringa canutus** Linn. *Knot.*

Rare; only a few specimens have been obtained in fifteen years collecting.

102. **Tringa maculata** Viell. *Pectoral Sandpiper.*

An exceedingly common migrant. To our Creole sportsmen, this and several other species are known under the name "Chorook," and sold in great nnmbers in the markets of New Orleans.

103. **Tringa fuscicollis** Viell. *White-rumped Sandpiper.*

A common migrant; coming and going with the preceding species.

104. **Tringa bairdii** Coues. *Baird's Sandpiper.*

Not as common as the preceding, but it is generally found with flocks of Pectoral and others.

105. **Tringa minutilla** Viell. *Least Sandpiper.*

Very common during migration.

106. **Tringa alpina pacifica** Coues. *Red-backed Sandpiper.*

A winter resident along the Gulf coast, where I obtained it in January, 1894, on Freshwater Bayou, Calcasieu parish.

107. **Ereunetes pusillus** Linn. *Semipalmated Sandpiper.*

A very common migrant. With most of the other Sandpipers it is commonly found on the mud-flats of the lakes and rivers.

108. **Calidris arenaria** Linn. *Sanderling.*

A regular migrant on the coast; at times very common.

109. **Limosa fedoa** Linn. *Marbled Godwit.*

A migrant and winter resident on the coast.

110. **Limosa haemastica** Linn. *Hudsonian Godwit.*

Migrates southward chiefly through the interior. Mr. Kohn has in his possession two specimens, one of which was shot at Vinton, Calcasieu parish, April 22, 1895, the other he obtained in New Orleans September 27 of the same year.

111. **Totanus melanoleucus** Gmel. *Greater Yellow-legs.*

Fairly common as a migrant, but numbers also pass the winter on the coast.

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112 **Totanus flavipes** Gmel. *Lesser Yellow-legs.*

In its movements, much like the preceding, and very common.

113. **Helodromus solitarius** Wils. *Solitary Sandpiper; Swee-Sweet.*

An abundant migrant; one of the early arrivals in September, but, on spring migration, sometimes leaving as late as the beginning of May [May 6, 1897].

114. **Symphemia semipalmata inornata** Brewster. *Western Willet; Tell-Tale.*

A common resident of the coast.

115. **Bartramia longicauda** Bechst. *Bartram's Sandpiper; Papabotte.*

An abundant fall and spring migrant; eagerly hunted and highly prized in lower Louisiana as a game bird. It arrives from its breeding places as early as the middle of July, and leaves in spring as late as May 20.

116. **Tryngites subruficollis** Viell. *Buff-breasted Sandpiper.*

Excepting on the coast-line, where it is said to be abundant in winter, this species must be regarded as a rare migrant in other parts of the state. I have obtained it but once in Louisiana [October, 1887], when I secured two specimens out of a flock of eight, on the so-called Racket-greens near New Orleans.

117. **Actitis macularia** Linn. *Spotted Sandpiper.*

Very common as a migrant, but numbers remain to breed. I have found it breeding along most of the old drainage canals of New Orleans.

118. **Numenius longirostris** Wils. *Long-billed Curlew; Corbigeau.*

A common winter resident; especially on the coast.

119. **Numenius borealis** Forst. *Eskimo Curlew.*

A migrant only; very common for a short while in fall and spring.

120. **Numenius hudsonicus** Lath. *Hudsonian Curlew.*

A migrant in most parts of the state, but resident along the coast in winter.

Family CHARADRIIDÆ.

121. **Charadrius squatarola** Linn. *Black-bellied Plover.*

A rare bird in most parts of the state. I noticed a flock of twelve or fifteen on the 2nd of March, 1890, at Pointe-à-la-Hache. I have been informed that it is common on the southwest coast of the state.

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122. **Charadrius dominicus** Muell. *Golden Plover.*

Fairly common during migration.

123. **Aegialitis vocifera** Linn. *Killdeer.*

In limited numbers resident throughout the state during the summer, but a most abundant winter resident along the coast and on the banks of the Mississippi.

124. **Aegialitis wilsonia** Ord. *Wilson's Plover.*

A common resident and breeding on the coast.

125. **Aegialitis semipalmata** Bonap. *Semipalmated Plover.*

Exceedingly common during migration; numbers wintering along the coast.

126. **Aegialitis meloda** Ord. *Piping Plover.*

A rare migrant. I obtained but one specimen among a flock of Semipalmated in October, 1893, on Lake Pontchartrain.

127. **Aegialitis meloda circumcincta** Ridg. *Belted Piping Plover.*

This sub-species of the Piping Plover is not as abundant during migration as the Semipalmated, yet fairly large flocks may be seen on the mud-flats of Lake Borgne and along the coast.

128. **Aegialitis nivosa** Cass. *Snowy Plover.*

Rare, except along the coast, where it occurs during some seasons in fairly large numbers.

Family APHRIZIDÆ.

129. **Arenaria interpres** Linn. *Turnstone.*

Fairly common on the coast throughout the year.

Family HÆMATOPODIDÆ.

130. **Hæmatopus palliatus** Temm. *American Oyster-catcher.*

A common resident on the coast.

LAND BIRDS.

Order GALLINÆ.

Family TETRAONIDÆ.

131. **Colinus virginianus** Linn. *Bob-white; Quail.*

An abundant resident everywhere in the state.

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132. **Tympanuchus americanus** Reich. *Prairie Chicken.*

Resident and breeding only in the southwestern portion of the state.

Family PHASIANIDÆ.

133. **Meleagris gallopavo fera** Viell. *Wild Turkey.*

Resident and breeding in many sections of the state.

Order COLUMBÆ.

Family COLUMBIDÆ.

134. **Ectopistes migratorius** Linn. *Passenger Pigeon.*

An occasional visitor during severe winters, and then only in small numbers.

135. **Zenaidura macroura** Linn. *Carolina Dove.*

An abundant resident in every part of the state.

136. **Columbigallina passerina terrestris** Chapman. *Ground Dove.*

A resident, but it cannot be said to be a common bird at all times.

137. **Melopelia leucoptera** Linn. *White-ringed Dove.*

This bird has been twice reported to me from Grand Island; once during May 1894, and the second time during August 1895. They were shot on both occasions, but on account of the heat could not be kept for preservation by the hunter.

Order RAPTORES.

Family CATHARTIDÆ.

138. **Cathartes aura** Linn. *Turkey Buzzard.*

An abundant resident everywhere.

139. **Catharista urubu** Viell. *Black Vulture; Carrion Crow.*

Like the preceding species, an abundant resident in all parts of the state.

Family FALCONIDÆ.

140. **Elanoides forficatus** Linn. *Swallow-tailed Kite.*

In some sections a fairly common summer resident; principally along the bayous. During the early part of September, it may be seen on the shores of Lake Pontchartrain, Lake Borgne, etc., in flocks of fifteen or twenty individuals.

141. **Elanus leucurus** Viell. *White-tailed Kite.*

An accidental visitor. On October 11, 1890, I shot one on the right bank of the Mississippi, opposite Kenner. This is, to my knowledge, the only record for Louisiana.

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142. **Ictinia mississippiensis** Wils. *Mississippi Kite.*

A common summer resident in almost every part of the state.

143 **Circus hudsonius** Linn. *Marsh Hawk.*

A common resident; especially on the prairies.

144. **Accipiter velox** Wils. *Sharp-shinned Hawk.*

Chiefly a winter resident, but I have found it, as well as the following species, near Madisonville, St. Tammany parish, in August [Aug. 5, 1890].

145. **Accipiter cooperi** Bonap. *Cooper's Hawk.*

A winter resident. I shot a female August 2, and a male August 11, 1890, on the so-called Pine Island, near Madisonville.

146. **Parabuteo unicinctus harrisi** Aud. *Harris's Hawk.*

While I have never met with this hawk, several parties have reported it as common on the coast and some of the larger islands.

147. **Buteo borealis** Gmel. *Red-tailed Hawk; Grand Mangeur de Poulets.*

A common winter resident.

148. **Buteo borealis kriderii** Hoopes. *Krider's Hawk.*

Not common during winter.

149. **Buteo borealis harlani** Aud. *Harlan.s Hawk.*

This hawk is said to breed in Louisiana, but I have only found it during winter, when it is not uncommon.

150. **Buteo lineatus** Gmel. *Red-shouldered Hawk.*

A winter resident only.

151. **Buteo lineatus alleni** Ridgw. *Florida Red-shouldered Hawk.*

One of the commonest hawks; resident and breeding throughout the state.

152. **Buteo latissimus** Wils. *Broad-winged Hawk.*

A fairly common resident and breeding.

153. **Archibuteo lagopus sancti-johannis** Gmel. *American Rough-legged Hawk.*

A not uncommon winter resident.

154. **Haliaetus leucocephalus** Linn. *Bald Eagle.*

Resident and breeding in various parts of the state.

155. **Falco peregrinus anatum** Bonap. *Duck Hawk.*

A common winter visitor; especially frequenting the marshes of the Mississippi delta, where it preys largely upon ducks and coots.

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156. **Falco columbarius** Linn. *Pigeon Hawk.*

A winter resident, but never as common as the other hawks.

157. **Falco sparverius** Linn. *Sparrow Hawk.*

A very common resident everywhere in the state; breeding throughout its range.

158. **Polyborus cheriway** Jacq. *Audubon's Caracara.*

Only found along the extreme Gulf coast, west of the Mississippi; fairly common, however, wherever it occurs.

159. **Pandion haliaetus carolinensis** Gmel. *American Osprey.*

This species occurs pretty much over the entire state. It is, however, more common in the southern half, where it breeds along the shores of lakes, etc.

Family STRIGIDÆ.

160. **Strix pratincola** Bonap. *American Barn Owl.*

A fairly common resident in almost every section.

Family BUBONIDÆ.

161. **Asio wilsonianus** Less. *Long-eared Owl.*

Said to be a resident, but I have found it to occur only during winter, and then by no means very common.

162. **Asio accipitrinus** Pall. *Short-eared owl.*

A fall and winter resident; much commoner than the preceding species, especially frequenting the prairies; flying low over the ground in daytime.

163. **Syrnium nebulosum** Forst. *Barred Owl.*

I believe that this owl occurs only during the winter in Louisiana; leaving, as a rule, early in February and March.

164. **Syrnium nebulosum alleni** Ridgw. *Florida Barred Owl.*

An abundant resident throughout the state.

165. **Nyctala acadica** Gmel. *Saw-whet Owl.*

I know of only one specimen occurring in this state, although it may be a regular but rare winter visitor. The specimen in question was shot during December, 1889, near Madisonville. The party who had killed it had nailed it against the side of his house, where I saw the remnants almost completely destroyed, during January, 1890.

166. **Megascops asio floridanus** Ridgw. *Florida Screech Owl.*

A common resident throughout the state.

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167. **Bubo virginianus** Gmel. *Great Horned Owl.*

A resident throughout the state; abundant in some sections, especially in the pine-hills of the eastern parishes.

168. **Nyctea nyctea** Linn. *Snowy Owl.*

Mr. Kohn informs me that many years ago a specimen of this owl was shot at Baton Rouge. From another less reliable source [on account of possibly mistaken identity] I have the record of one being shot at Bayou des Allemands, during the winter of 1878-1879.

169. **Speotyto cunicularia hypogea** Bonap. *Burrowing Owl.*

It has been only recently that I have been able to confirm a few previous reports as to the occurrence of this bird in Louisiana, but from the accounts received from Jackson, it is quite numerous on the prairies, and it undoubtedly breeds there as well. A specimen [a male] received from Jackson, was shot there November 24, 1898.

Order PSITTACI.

Family PSITTACIDÆ.

170. **Conurus carolinensis** Linn. *Carolina Paroquet.*

It is extremely doubtful whether this bird should still be regarded as a Louisiana species. During sixteen years of collecting and observation, in almost every section of the state, I have never obtained either specimen or data, and in localities which I have thought likely to be still its habitat, the people did not know that a paroquet had ever existed in Louisiana. Tulane museum possesses a specimen, which was undoubtedly collected in Louisiana, but when or where I have been unable to determine.

Order COCCYGES.

Family CUCULIDÆ.

171. **Crotophaga ani** Linn. *Ani.*

So far, but one specimen has been secured in the state, notwithstanding that it has been several times reported from Plaquemine and St. Bernard parishes. One of three individuals was shot by a colored man near Diamond, Plaquemine parish, on July 29, 1893, and given by him in the flesh to Mr. H. L. Ballowe. The specimen is now in the collection of Tulane museum.

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172. **Crotophaga sulcirostris** Swains. *Groove-billed Ani.*

An occasional visitor to the southern part of the state. A specimen taken near New Orleans several years ago is in the collection of Tulane Museum.

173. **Coccygus minor** Gmel. *Mangrove Cuckoo.*

This species is claimed to occur along the coast, but, so far, I have no confirmation.

174. **Coccygus americanus** Linn. *Yellow-billed Cuckoo.*

An abundant summer resident throughout the state.

175. **Coccygus erythrophthalmus** Wils. *Black-billed Cuckoo.*

A spring and fall migrant, and never common.

Family ALCEDINIDÆ.

176. **Ceryle alcyon** Linn. *Belted Kingfisher.*

A common resident throughout the state.

Order PICI.

Family PICIDÆ.

176. **Campephilus principalis** Linn. *Ivory-billed Woodpecker.*

A rare resident in a few sections of the state. From reliable sources I am informed that it is not uncommon along Bayou Mason, Franklin parish. Most of the reports are, however, referable to the "Log-cock."*

178. **Picus villosus audubonii** Swains. *Southern Hairy Woodpecker.*

A common resident in all parts of the state where timber exists.

179. **Picus pubescens** Linn. *Downy Woodpecker.*

Wherever the preceding species is found, this will also occur.

180. **Picus borealis** Viell. *Red-cockaded Woodpecker.*

This is essentially a bird of the pine-woods; abundant, especially in the pine flats of St. Tammany, St. Helena, Tangipahoa and like parishes. In northwestern Louisiana it is not quite so common, and in the southwestern parts it does not occur.

181. **Sphyrapicus varius** Linn. *Yellow-bellied Woodpecker.*

A common winter resident in almost all parts of the state.

182. **Ceophlœus pileatus** Linn. *Pileated Woodpecker; Log-cock.*

A common resident in all wooded parts; preferring heavy timber to the open pine woods.

*This species has since been found in limited numbers in a swamp in Franklin parish; the author having procured seven specimens and one nest in that locality in July, 1899.—G. E. B.

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183. **Melanerpes erythrocephalus** Linn. *Red-headed Woodpecker.*

An abundant summer resident, but numbers remain throughout the year.

184. **Melanerpes carolinus** Linn *Red-bellied Woodpecker.*

An abundant resident.

185. **Colaptes auratus** Linn. *Golden-winged Woodpecker; Flicker.*

A common resident in almost every section of the state.

Order MACROCHIRES.

Family CAPRIMULGIDÆ.

186. **Antrostomus carolinensis** Gmel. *Chuck-will's-widow.*

A summer resident only; arriving in Louisiana about the middle of April, and leaving about the end of August or early in September. It is fairly common and breeds throughout its range.

187. **Antrostomus vociferus** Wils. *Whippoorwill.*

A summer resident only in the northwestern part of the state, but occuring further south during the winter.

188. **Chordeiles virginianus** Gmel. *Night Hawk.*

An abundant summer resident; known throughout the state as "Bullbat." The new sub-species (*Cordeiles virginianus chapmani* Sennet) has, so far, not been taken by me.

Family MICROPODIDÆ.

189. **Chætura pelagica** Linn. *Chimney Swift.*

An abundant summer resident; arriving from its winter quarters, in almost all of the Central American states, in the beginning of March.

Family TROCHILIDÆ.

190. **Trochilus colubris** Linn. *Ruby-throated Humming Bird.*

A common summer resident, but during mild winters a few remain within our precincts.

Order PASSERES.

Family TYRANNIDÆ.

191. **Milvulus forficatus** Gmel. *Scissor-tailed Flycatcher.*

This species can only be regarded as an occasional visitor, especially during the fall months. The last note I have of its occurrence is October 6, 1889, when I saw a flock of ten near Kenner.

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192. **Tyrannus tyrannus** Linn. *Kingbird; Gros Grasset.*

An abundant summer resident. Breeding.

193. **Myiarchus crinitus** Linn. *Great Crested Flycatcher.*

A common summer resident. Breeding.

194 **Sayornis phœbe** Lath. *Phœbe; Pewee.*

A common resident in winter. So far, the earliest date of arrival is September 25; the latest date of departure, April 26.

195. **Contopus borealis** Swains. *Olive-sided Flycatcher.*

A spring and fall migrant; not very common. Mr. H. L. Ballowe secured one at Diamond, Aug. 31, 1894.

196 **Contopus virens** Linn. *Wood Pewee.*

A common summer resident; breeding. The earliest date of arrival at New Orleans station is March 27, 1897, and the latest date of departure, October 26, 1896.

197. **Empidonax flaviventris** Baird. *Yellow-bellied Flycatcher.*

A spring and fall migrant; tolerably common.

198. **Empidonax virescens** Viell. *Acadian Flycatcher.*

A common summer resident in almost all parts of the state; breeding throughout its range. It arrives in April (April 8, 1898) and leaves in October (October 10, 1898).

199. **Empidonax traillii alnorum** Brewster. *Alder Flycatcher.*

Fairly common during spring and fall migration.

200. **Empidonax minimus** Baird. *Least Flycatcher.*

Like the preceding, only a migrant; fairly common.

Family ALAUDIDÆ.

201. **Otocoris alpestris** Linn *Horned Lark.*

This species probably occurs only as an accidental, rather than a regular winter visitor. Mr. Kohn secured it January 6, 1879, on the lake shore, at Mandeville. A number of them were seen.

Family CORVIDÆ.

202. **Cynanocitta cristata** Linn. *Blue Jay.*

An abundant resident throughout the state.

203. **Corvus americanus** Aud. *Common Crow.*

A common resident.

204. **Corvus ossifragus** Wils. *Fish Crow.*

An abundant resident in the state; especially in the southern part. Breeding wherever it occurs.

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Family ICTERIDÆ.

205. **Dolichonyx oryzivorus** Linn. *Bobolink.*

Rather an irregular bird in its movements, but, now and then, occurring in immense flocks during migration. The earliest date of arrival within our limits was April 4, 1896, when I saw two on Avery's Island. On May 26, 1890, I secured, on the shore of Lake Pontchartrain, a female in full plumage and with ovaries fully developed. I shot her carrying a piece of dried grass.

206. **Molothrus ater** Bodd. *Cow-bird.*

An abundant winter resident.* A smaller resident form has been reported to me by Mr. H. H. Kopman, as breeding in St. James and St. Mary's parishes. This form, however, may prove to be *M. ater obscurus* Gmel.—Dwarf Cow-bird.

207. **Xanthocephalus xanthocephalus** Bonap. *Yellow-headed Blackbird.*

A winter resident in the southwestern parts only, especially in Cameron parish. It has never, to my knowledge, been noted as occurring in this state, on the east bank of the Mississippi.

208. **Agelaius phœniceus** Linn. *Red-winged Blackbird; Rice-bird.*

An abundant resident nearly throughout the state; breeding abundantly along the watercourses and sea coasts of the southern section.

209. **Sturnella magna** Linn. *Field-lark.*

A common resident all over the state.

210. **Icterus spurius** Linn. *Orchard Oriole; Pape de Prairie.*

A common summer resident; breeding wherever it occurs.

211. **Icturus galbula** Linn. *Baltimore Oriole; Pape Aurore.*

Fairly common during spring and fall migration in most parts of the state. It is also a summer resident; breeding in East Feliciana and northward.

212. **Scolecophagus carolinus** Muell. *Rusty Blackbird; Rusty Grackle.*

An abundant winter resident; remaining until late into spring (May 2, 1897).

213. **Scolecophagus cyanocephalus** Wagl. *Brewer's Blackbird.*

Although a Western species, it is not of unusual occurrence during the winter in the southern part of the state. I have noted and taken it on several occasions.

*During the summer of 1899 I found this species a common breeder in northern Franklin Parish.—G. E. B.

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214. **Quiscalus quiscula** Linn. *Purple Grackle.*

Resident and breeding, but rather locally confined. I have noted it commonly in East and West Baton Rouge and St. Tammany parishes.

215. **Quiscalus quiscula aglæus** Baird. *Florida Grackle.*

A common resident and breeding. Of the three Grackles it is the commonest in the state.

216. **Quiscalus quiscula æneus** Ridgw. *Bronzed Grackle.*

Resident and breeding. I have found this sub-species, as well as the two preceding, breeding in the gum swamps on the edge of the lake marshes near Madisonville, St. Tammany parish.

217. **Quiscalus major** Viell. *Boat-tailed Grackle.*

An abundant resident in the southern portion of the state, especially in the marshes.

Family FRINGILLIDÆ.

218. **Carpodacus purpureus** Gmel. *Purple Finch.*

A regular winter resident in most parts of the state; common, however, only during severe winters.

219. **Astragalinus tristis** Linn. *American Goldfinch.*

An abundant winter resident, especially during severe winters.

220. **Astragalinus pinus** Wils. *Pine Siskin.*

A fairly regular winter resident throughout the pine-woods parishes.

221. **Passer domesticus** Linn. *English Sparrow.*

Has now fairly taken possession of that section of the state along the Mississippi river, but the northeastern and northwestern portions seem, as yet, to be free from it.

222. **Poœcetes gramineus** Gmel. *Vesper Sparrow.*

A fairly common winter resident; arriving in September, although one record is as early as August 5 (1893).

223. **Ammodramus sandwichensis savanna** Wils. *Savanna Sparrow.*

An abundant winter resident throughout the state.

224. **Ammodramus savannarum passerinus** Wils. *Grasshopper Sparrow.*

This little sparrow is an abundant summer resident in all parts of the state, and its quaint song may be heard almost throughout the year; for even during some winters it is quite common.

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225. **Ammodramus leconteii** Aud. *Le Conte's Sparrow.*

A winter resident. I have found it rather common on Avery's Island during January.

226. **Ammodramus caudacutus** Gmel. *Sharp-tailed Sparrow.*

Common in the salt-marshes of the coast. I have found it quite common on the so-called "floating prairies" of Lake Pontchartrain.

227. **Ammodramus maritimus** Wils. *Seaside Sparrow.*

Very common on the coast, especially in the salt-marshes, and on the borders of the lakes.

228. **Chondestes grammacus** Say. *Lark Finch.*

Although rather more of a western prairie form, this species has been found quite common in several parts of the state, and is a fairly regular breeder. It has been obtained in Madison and Plaquemine parishes.

229. **Zonotrichia leucophrys** Forst. *White-crowned Sparrow.*

While this species is a regular winter resident in Louisiana, it cannot be regarded as very common.

230. **Zonotrichia albicollis** Gmel. *White-throated Sparrow.*

A much more abundant winter resident than the preceding species.

231. **Spizella socialis** Wils. *Chipping Sparrow.*

Resident in the pine-woods; abundant in winter.

232. **Spizella pusilla** Wils. *Field Sparrow.*

A common winter resident; chiefly in the pine-woods.

233. **Junco hyemalis** Linn. *Junco; Slate-colored Snow-bird.*

A regular, but not common winter resident. Mr. Otto Wideman reported it to me from Mandeville on March 2, 1897.

234. **Peucæa æstivalis bachmanii** Aud. *Bachman's Sparrow.*

This species, although not uncommon in the pine-woods, seems to select its habitat with more care than any other species of sparrow that I know of. I have always noticed that in any given locality, of apparently similar characteristics, only one or more parts would be tenanted by Bachman's Sparrow. It breeds wherever it occurs.

235. **Melospiza fasciata** Gmel. *Song Sparrow.*

A winter resident in the pine-woods, but chiefly a migrant.

236. **Melospiza georgiana** Lath. *Swamp Sparrow.*

An abundant winter resident throughout the state, staying late into spring (May 3, 1898).

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237. **Passerella iliaca** Merr. *Fox Sparrow.*

A fairly common winter resident in most parts of the state.

238. **Pipilo erythrophthalmus** Linn. *Towhee.*

A common winter resident in every section of the state; abundant in winter.

239. **Cardinalis cardinalis** Linn. *Cardinal; Red-bird.*

This well-known songster is an abundant resident in all parts of the state.

240. **Habia ludoviciana** Linn. *Rose-breasted Grosbeak.*

A tolerably common fall and spring migrant; arriving generally at New Orleans station during the first half of April, and again passing through during September.

241. **Guiraca cœrula** Linn. *Blue Grosbeak.*

A most abundant summer resident in some sections of the state, especially in the Florida parishes, where it is generally called "Ricebird." Flocks of thousands descend upon the ripe rice during August and September.

242. **Cyanospiza cyanea** Linn. *Indigo Bird; Eveque; Pape bleu.*

An abundant summer resident in all parts of the state.

243. **Cyanospiza ciris** Linn. *Painted Finch; Nonpareil; Pape rouge.*

Like the preceding, an abundant summer resident, but a few evidently remain throughout the winter, as I have, for several years, seen individuals during December and January.

244. **Spiza americana** Gmel. *Black-throated Bunting.*

A common migrant. It arrives during the early days of April and leaves in the beginning of May. In the fall, it passes through in September and October.

Family TANAGRIDÆ.

245. **Piranga ludoviciana** Wils. *Louisiana Tanager.*

Thus far, only one record has been obtained for this Western form in this state. The specimen was secured by Mr. Allison near New Orleans, March 19, 1898. It was identified by Dr. A. K. Fisher, of Washington, D. C.

246. **Piranga erythromelas** Viell. *Scarlet Tanager.*

A fairly common fall and spring migrant; arriving during the first days of April and leaving about the end of September.

247. **Piranga rubra** Linn. *Summer Redbird; Quaker.*

An abundant summer resident everywhere in the state; arriving during the early days of April; leaving from the mid-

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dle to the end of September, a few stragglers remaining until the end of October.

Family HIRUNDINIDÆ.

248. **Progne subis** Linn. *Purple Martin.*

A common summer resident and breeding. This species seems to inaugurate, as well as speed the annual migration, for it is the first migrant to arrive and the last to leave. The earliest date of its arrival that I have been able to note was on January 29, 1890; the next earliest: January 31, 1894, and February 7, 1897. The latest date of departure, October 22, 1894.

249. **Petrochelidon lunifrons** Say. *Cliff Swallow.*

A fairly common migrant. I have, however, every reason to believe that this species breeds in limited numbers in Louisiana, as I have secured specimens in New Orleans as early as August 2, whose plumage was too immature to have stood the test of migration.

250. **Hirundo erythrogaster** Bodd. *Barn Swallow.*

Until recently, this species was not thought to breed in the state, but according to Mr. H. H. Kopman and Mr. A. B. Blakemore it does so in the vicinity of New Orleans as well as along the coast, eastward. It arrives within our precincts in March (March 20, 1894—so far, the earliest date), and generally leaves in October. Mr. Blakemore saw it as late as November 3, 1895, and Messrs. Kopman and Allison on the same date in 1896. Concerning the movements of this species Mr. Kopman furnishes me with the following interesting note: "Barn Swallow—August 4—Many males were passing, following the coast; these birds went singly. August 11—A second flight began; the birds, this time, went in loose flocks and were principally females and young. The species doubtlessly breeds in the vicinity of Beauvoir."

251. **Tachycineta bicolor** Viell. *White-bellied Swallow.*

The most abundant of all our swallows; it occurs everywhere in the state, and at all times of the year. It feeds on *Myrica cerifera*, and is called "Cirier" in the markets of New Orleans, where it is sold abundantly.

252. **Clivicola riparia** Linn. *Bank Swallow.*

A regular summer resident in some sections of the state wherever high river-banks afford nesting places.

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253. **Stelgidopteryx serripennis** Aud. *Rough-winged Swallow.*

A regular summer resident; frequenting the same localities as the preceding species.

Family AMPELIDÆ.

254. **Ampelis cedrorum** Vieill. *Cedar-bird; Murier.*

In Louisiana, this species is everything but a breeder, so erratic is it in its movements. In the fall, it appears sometimes as early as October 10, then again not until the beginning of December. I have found it in large flocks in the early summer (June 3, at Madisonville).

Family LANIDÆ.

255. **Lanius ludovicianus** Linn. *Loggerhead Shrike.*

A common resident and breeding throughout the state.

256. **Lanius ludovicianus migrans** Chap. *Migratory Loggerhead Shrike.*

This sub-species is a common winter visitor throughout the state, but it is impossible to ascertain its movements, owing to its resemblance to the preceding species.

Family VIREONIDÆ.

257. **Vireo olivaceus** Linn. *Red-eyed Vireo; Grasset.*

An abundant summer resident; breeding. It arrives within our borders later than the middle of March (earliest date, March 18, 1894) and leaves in October. It feeds principally on Magnolia seeds in the fall, upon which they become exceedingly fat and well flavored.

258. **Vireo philadelphicus** Cass. *Philadelphia Vireo.*

A not very common migrant; passing through the state during April. During the fall migration it is not seen until rather late in October [October 10, 1896]. The more remarkable, therefore, is the record of Mr. H. Ballowe, who procured a specimen at Hester, St. James parish, as early as August 2, 1893.

259. **Vireo gilvus** Vieill. *Warbling Vireo.*

A fairly common summer resident throughout the state. It arrives within our precincts at the end of March [March 27, 1897], and leaves in September.

260. **Vireo flavifrons** Vieill. *Yellow-throated Vireo.*

A summer resident throughout the state, but rather more common than the preceding species. It arrives in the begin-

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ning of April [April 4, 1896; April 9, 1895], but stays late into October [October 11, 1896].

261 **Vireo solitarius** Wils. *Blue-headed Vireo.*

A fairly common winter resident; arriving from beyond our southern border at the end of March [March 26, 1894; March 28, 1895] departing in September and the early days of October.

262. **Vireo noveboracensis** Gmel. *White-eyed Vireo.*

Probably the most abundant of all our Vireos; principally a summer resident, but many pass their winters within our borders.

Family MNIOTILTIDÆ.

263. **Mniotilta varia** Linn. *Black-and-white Creeper.*

An abundant migrant throughout the state, but in St. Tammany and Tangipahoa parishes I have found young birds, in fairly large numbers and scarcely able to fly, in the early days of July. I have no doubt but that they were hatched in the gum-swamps of the vicinity.

264. **Protonotaria citrea** Bodd. *Prothonotary Warbler.*

An abundant summer resident throughout the entire state; arriving within our southern border in March [earliest date for New Orleans station March 15, 1894], leaving toward the end of September.

265. **Helinaia swainsonii** Aud. *Swainson's Warbler.*

A summer resident in various parts of the state. It was obtained by Chas. Galbraith [a collector of bird-skins for millinery purposes] near Lewisburg, St. Tammany parish, in March and April, 1886 and 1887. I shot a male on June 4, 1888, near Amite, on the Tangipahoa river, and Messrs Kopman, Allison and Blakemore have found it rather common on the right bank of the Mississippi, opposite New Orleans. It has also been recorded from Bayou Sara.

266. **Helmitherus vermivorus** Gmel. *Worm-eating Warbler.*

A not very common summer resident. It arrives in the beginning of April, and leaves in September.

267. **Helminthophila bachmani** Aud. *Bachman's Warbler.*

Mr. Charles Galbraith's records, published in the Auk [Vols. IV and V], are, thus far, the only notes on this species. It is undoubtedly not only rare generally, but only a migrant as well.

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268. **Helminthophila pinus** Linn. *Blue-winged Warbler.*

A migrant. It arrives within our southern borders at the end of March. During fall migration, the earliest arrivals in the state reach about the middle of August.

269. **Helminthophila chrysoptera** Linn. *Golden-winged Warbler.*

Like the preceding, a migrant only, and observing, during migration, very much the same dates of arrival and departure.

270. **Helminthophila celata** Say. *Orange-crowned Warbler.*

A fairly common, and sometimes even an abundant winter resident in the southern parts of the state from November to the beginning of March [March 11, 1894].

271. **Helminthophila peregrina** Wills. *Tennessee Warbler*

A common migrant; arriving at the end of March and beginning of April. It is, however, much more common during fall migration; reaching the southern parts of the state at the end of September [September 23, 1897—so far the earliest record], and has been, as "last," noted as late as the end of October [October 27, 1896].

272. **Compsothlypis americana** Linn. *Blue-and-yellow-backed Warbler.*

A common summer resident throughout the state; arriving in February and March [February 22, 1893—earliest date], and leaving in October [in 1895, the last was seen near New Orleans on October 19).

273. **Dendroica tigrina** Gmel *Cape May Warbler.*

For this rare warbler there is, thus far, but one record. The specimen, in question, was secured in April, 1890, on the old Orleans Canal, near New Orleans, by Mr. Erich Wittkugel.

274. **Dendroica æstiva** Gmel. *Summer Warbler.*

An exceedingly common migrant in all parts of the state; arriving in the beginning of April. During fall migration, the bulk pass through in September. I have found numbers of this species breeding near Madisonville, St. Tammany parish.

275. **Dendroica cærulescens** Gmel. *Black-throated Blue Warbler.*

A migrant, reaching our southern portions at the end of March; passing through the state again in September.

276. **Dendroica coronata** Linn. *Myrtle Warbler.*

One of the most abundant winter residents of all Louisiana's migrants; heard and seen in almost every part of the

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state from October to April. The earliest date of arrival during the past seven or eight years, was October 17, 1896, and the last seen, April 27, 1897.

277. **Dendroica maculosa** Gmel. *Magnolia Warbler.*

A very common migrant throughout the state; arriving on its spring migration in the beginning of April. In 1895 the last was noticed as late as May 2. During fall migration the earliest arrival at New Orleans was September 17, 1897, and in 1895 it was still extremely common, October 19.

278. **Dendroica rara** Wils. *Cerulean Warbler.*

Fairly common during migration; less common during the summer. It breeds, however, in the state, and I have found it in Franklin and St. Tammany parishes. It arrives in March and leaves in October.

279. **Dendroica pennsylvanica** Linn. *Chestnut-sided Warbler.*

Fairly common during migration; arriving in Louisiana in the first days of April, and on the return voyage, in the fall, it passes through the state in September.

280. **Dendroica castanea** Wils. *Bay-breasted Warbler.*

Like the preceding, only a migrant, and in its movement it is also very much the same, with the exception that it seems to tarry longer on its voyage. In spring, 1897, the "last" [a pair] were noticed at New Orleans on May 5.

281. **Dendroica striata** Forst. *Black-Poll Warbler.*

Fairly common during migration; arriving in the beginning of April, and returning in the fall about the end of September, the last being usually seen October 10.

282. **Dendroica blackburniæ** Gmel. *Blackburnian Warbler.*

This beautiful species is unfortunately only a migrant in our state, and not a common one either. It enters Louisiana on its way north in April, returning, during fall migration, towards the end of September and October. The earliest arrival for fall records for New Orleans was September 24, 1897; the latest October 9, 1896.

283. **Dendroica dominica albilora** Baird. *Sycamore Warbler.*

A common summer resident and breeding throughout the state. It becomes common from the 9th to the 13th of March annually, but the earliest date of first arrival, so far, is Feb. 27, 1897. It remains with us until the latter part of September, the "last" being often observed on the 10th or 11th of October.

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284. **Dendroica vireus** Gmel. *Black-throated Green Warbler.*

A common migrant; entering our precincts in April, and passing through the state without delay. In the fall it arrives about the middle of September, but the latest date of the "last seen" was October 22, 1896, at New Orleans.

285. **Dendroica vigorsii** And. *Pine Warbler.*

An exceedingly common resident throughout the year in all parts of the state where pines grow. Breeding.

286. **Dendroica palmarum** Gmel. *Red-poll Warbler.*

A very common winter resident throughout Louisiana; arriving from its northern breeding-places during the beginning of November and leaving at the end of March and beginning of April. The earliest date of arrival and latest day of departure for New Orleans are November 6, 1894, and April 11, 1896, respectively.

287. **Dendroica discolor** Viell. *Prairie Warbler.*

Being fairly common about Centreville and Ariel, in Mississippi, not many miles from our state line, and the localities exhibiting the same characteristics, I think it merely an oversight that there is no record of this not uncommon warbler having been taken within our precincts.

288. **Seiurus aurocapillus** Linn. *Oven-bird.*

Common during migration; arriving from the south in April, the last of the spring migrants being generally noticed in the early days of May. In the fall it arrives during September, and the last have passed through by the middle of October. It is, however, a winter resident in the extreme south and southwest. I obtained it on Avery's Island in January 1894 and 1896.

289. **Seiurus noveboracensis** Gmel. *Water-Thrush.*

Like the preceding, very common during migration, especially in autumn. The latest date of departure in spring is May 7, 1897.

290. **Seiurus motacilla** Viell. *Louisiana Water-Thrush.*

A summer resident; quite common on the banks of the bayous in the Florida parishes, and the middle and northern sections.

291. **Geothlypis formosa** Wils. *Kentucky Warbler.*

A common summer resident and breeding in almost every section of the state. It first makes its appearance within our limits during the first days of April, and becomes common

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about the middle of the same month. It winters south of our borders, and generally leaves during the first half of September.

292. **Geothlypis philadelphia** Wils. *Mourning Warbler.*

A spring and fall migrant only, and not very common. It arrives from the south not earlier than the middle of April. The last is usually noticed at the end of the month. In fall migration the "last" has been seen at New Orleans as late as October 7 [1896].

293. **Geothylpis trichas occidentalis** Brewst. *Western Maryland Yellow throat.*

An abundant resident throughout the state.

294 **Icteria virens** Linn. *Willow-chat; Yellow-breasted chat*

A common summer resident and breeding in most sections of the state, preferring, however, the vicinity of watercourses and is especially fond of the willow-ponds of the southern parts of Louisiana. This species never occurs within our precincts before the 15th or 18th of April, and is never common until about the end of that month, and sometimes not until the 1st or 2d of May. It leaves in August, and the last have departed before the middle of September.

295. **Wilsonia mitrata** Gmel. *Hooded Warbler.*

A common summer resident and breeder throughout the state. Its earliest arrival in spring for New Orleans, during the past eight years, was March 8, 1896; the latest date, March 23, 1895, and the bulk did not come until March 30. It leaves the state in September, and the last straggler was seen October 19 [1895].

296. **Setophaga ruticilla** Linn. *American Redstart.*

An abundant migrant in spring and fall. It reaches our southern border during the first days of April, and remains with us until the end of the month. The "last" was noted May 2 [1895]. The species is, however, one of the first arrivals of the fall migration. The earliest date on which it was seen was July 30, 1897. It became common on August 11, and the "last" had left before the end of September.

Family MOTACILLIDÆ.

297. **Anthus pennsylvanicus** Lath. *American Pipit.*

An abundant winter resident throughout the state; arriving during the latter part of October (Oct. 21, 1896—earliest date for New Orleans]; leaving during the latter half of April ["last" seen May 2, 1894].

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298. **Anthus spragueii** Aud. *Sprague's Pipit.*

A common winter resident in the southern sections of the state, especially along the Mississippi. It arrives in October and leaves in April.

Family TROGLODYTIDÆ.

299. **Mimus polyglottus** Linn. *Mockingbird.*

An abundant resident in every part of the state.

300. **Galeoscoptes carolinensis** Linn. *Catbird.*

A common winter resident throughout the state; usually arriving within the state limits towards the latter part of September, the earliest date of arrival at New Orleans being September 7, 1896. During spring migration, the bulk generally pass through the state about the latter part of April, and the "last" is usually seen during the first few days of May [May 5, 1897].

301. **Harporynchus rufus** Linn. *Brown Thrasher.*

A common resident throughout the state, but rather an irregular breeder in the southern section.

302. **Thryothorus ludovicianus** Lath. *Carolina Wren.*

An abundant resident throughout the state.

303. **Thryomanes bewickii** Aud. *Bewick's Wren.*

A common winter resident, but confined to certain localities. It has, so far, been found only in St. James, Orleans and Plaquemine parishes, but it undoubtedly occurs elsewhere in the state.

304. **Troglodytes aedon** Viell. *House Wren.*

A very common winter resident, but arriving late in the fall; not usually until November.

305. **Anorthura hiemalis** Viell. *Winter Wren.*

A fairly common winter resident, but arriving late; not usually before the middle of November. The earliest date, so far, for New Orleans is November 1, 1897.

306. **Cistothorus stellaris** Licht. *Short-billed Marsh Wren.*

A winter resident and not common.

307. **Cistothorus palustris** Wils. *Long-billed Marsh Wren.*

A very common, if not abundant resident, especially in the northern part of the Florida parishes and southern section.

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Family CERTHIIDÆ.

308. **Certhia familiaris fusca** Barton. *Brown Creeper.*

A transient winter visitor throughout the state, but never in great numbers. It arrives at the end of October, and the "last" usually leaves at the end of March.

Family PARIDÆ.

309. **Sitta carolinensis** Lath. *White-bellied Nuthatch.*

A common resident in the pine-hills and pine-flats, especially of eastern Louisiana.

310. **Sitta pusilla** Lath. *Brown-headed Nuthatch.*

A common resident; occupying the same range as the preceding.

311. **Parus bicolor** Linn *Tufted Titmouse.*

A common resident in many sections of the state; preferring, however, the pine-wood parishes. It is not found in the extreme southwestern section of the state.

312. **Parus carolinensis** Aud. *Carolina Chickadee.*

An abundant resident throughout the state.

Family SYLVIIDÆ.

313. **Regulus satrapa** Licht. *Golden-crowned Kinglet.*

A fairly common winter resident in many parts of the state where heavily timbered localities occur. It arrives very late in the fall, and leaves early in March.

314. **Regulus calendula** Linn. *Ruby-crowned Kinglet.*

Much more abundant than the preceding, although only a winter resident. It arrives within our borders during the latter half of October, and leaves about the middle and end of March. The latest date of its presence at New Orleans, so far noted, is April 8, 1898.

315. **Polioptila cærulea** Linn. *Blue-gray Gnatcatcher.*

A very common summer resident and breeding throughout the state. A few occasionally winter in the southern section.

Family TURDIDÆ.

316. **Hylocichla mustelinus** Gmel. *Wood Thrush; Caille Pivelee.*

Resident in summer in some localities; a common migrant in all parts of the state. It usually arrives in spring within our borders during April, the earliest date of arrival at New Orleans, so far noted, being March 26, 1898. The

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latest date of departure for fall migration is October 11, 1896. This species is shot in large numbers for the New Orleans markets.

317. **Hylocichla fuscescens** Steph. *Wilson's Thrush.*

A common migrant; arriving in April, the "last" of the spring migrants being generally seen in the early part of May. It arrives again from the north in September, a few stragglers being sometimes noticed as late as the middle of October.*

318. **Hylocichla aliciæ** Baird. *Gray-cheeked Thrush.*

A common spring and fall migrant; arriving from the south in April. The earliest record for New Orleans is March 26, 1897; the bulk not appearing until May 4, and the "last" was noted May 7. In the autumn migration it leaves Louisiana during the latter half of September.

319. **Hylocichla ustulata swainsonii** Cab. *Olive-backed Thrush.*

Like the preceding, a fairly common transient in spring and autumn. It reaches the southern portion of the state in April, the last being usually noticed in the beginning of May [latest date at New Orleans—May 7, 1897]. On its autumn voyage it reaches New Orleans about September 25. The latest date of the "last"—October 9, 1894.

320. **Hylocichla aonalaschkæ pallasii** Cab. *Hermit Thrush.*

A common winter resident in the southern and southwestern parts of the state, but arriving rather late in the fall; usually not before the end of October, and the bulk do not make their appearance until the beginning of November. It departs at the end of March and beginning of April.

321. **Merula migratoria** Linn. *American Robin.*

An abundant winter resident throughout the state; arriving about the end of October and beginning of November; leaving in February and March, although stragglers often stay until far into April [latest date of "last" at New Orleans —April 21, 1895].

Family SAXICOLIDÆ.

322. **Saxicola œnanthe** Linn. *Wheatear.* §

*The but little differing Western race of this species (H. fuscescens salicicola Ridgw.—Willow Thrush) has been taken at Ariel, Miss, by Mr. A. Allison.—G. E. B.

§This species should perhaps have been placed in the "Hypothetical List," but I have preferred retaining it here on the ground that, being a not uncommon bird in the northeastern portions of the United States, it is just possible, under the recurrent waves of migration, it may again be recorded as far south as Louisiana.—G. E. B.

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There is but a single record of this species for Louisiana, and perhaps for the whole of the United States, with the exception of the northeastern portions. The specimen which made this record was secured by myself on the outskirts of New Orleans, September 12, 1888. The bird was mounted and is now in the collection of Mr. Kohn.

328. **Sialis sialis** Linn. *Bluebird.*

A constant and common resident throughout the state. Since the extremely cold weather of February, 1895, their numbers have been greatly reduced. During the breeding season this species decidedly prefers the pine regions to other parts of the state.

HYPOTHETICAL SPECIES.

1. **Colymbus nigricollis californicus** Heerm. *American Eared Grebe*
2. **Larus marinus** Linn. *Great Black-backed Gull.*
3. **Sterna hirundo** Linn. *Common Tern.*
4. **Histrionicus histrionicus** Linn. *Harlequin Duck.*
5. **Dendrocygna autumnalis** Linn. *Black-bellied Tree-Duck.*
6. **Phalaropus lobatus** Linn. *Northern Phalarope.*
7. **Ereunetes occidentalis** Lawr. *Western Sandpiper.*
8. **Buteo swainsoni** Bonap. *Swainson's Hawk.*
9. **Aquila chrysaetos** Linn. *Golden Eagle.*
10. **Megascops asio** Linn. *Screech Owl.*
11. **Milvulus tyrannus** Linn. *Fork-tailed Flycatcher.*
12. **Tyrannus dominicensis** Gmel. *Gray Kingbird.*
13. **Tyrannus verticalis** Say. *Western Kingbird.*
14. **Otocoris alpestris giraudi** Hensh. *Texas Horned Lark.*
15. **Molothrus ater obscurus** Gmel. *Dwarf Cowbird.*
16. **Ammodramus sandwichensis alaudinus** Bonap. *Western Savanna Sparrow.*
17. **Helminthophila ruficapilla** Wils. *Nashville Warbler.*
18. **Dendroica dominica** Linn. *Yellow-throated Warbler.*
19. **Dendroica palmarum hypochrysea** Ridgw. *Yellow Palm Warbler.*
20. **Geothlypis agilis** Wils. *Connecticut Warbler.*
21. **Wilsonia pusilla** Wils. *Wilson's Warbler.*
22. **Sitta canadensis** Linn. *Red-bellied Nuthatch.*

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VIII.

NOTE ON THE OCCURRENCE OF FILARIA PAPILLOSA.

W. H. DALRYMPLE, M. R. C. V. S.

(Communicated March 3, 1899).

The following are a few brief observations relative to what is known of *Filaria papillosa*, and we might add, its connection with "verminous ophthalmia." This parasite is perhaps rendered of more interest to us at this time, on account of a specimen having quite recently been taken from the anterior chamber of the eye of a horse, at this Institution*

This specimen, as I have no doubt you are all aware, belongs to the order "nematoda," which is characterized by having a digestive canal, generally complete, with two openings. Elongated body, frequently slender, and even filiform, etc. The members of this order are quite numerous, and are found in all the organs of the domestic animals, with the exception of the bones and the nervous system.

Abildgaard has given to this parasite the name of *Filaria equina*, while *Filaria papillosa* is the one given to it by Rudolphi and which we have chosen on this occasion.

Its description, according to Neumann, in his "Treatise on Parasites and Parasitic Diseases," is as follows:

Body long, filiform, white, attenuated at both ends, and especially behind. Mouth small and provided with a chitinous infundibuliform ring, the border of which is divided into four rounded and salient papillæ; outside this ring are four sub-median papillæ, in the form of spinules. Male, 6cm. to 8cm. long; tail curved in a spiral manner, and having eight papillæ on each side, of which there are four pre-anal, and four post-anal; two unequal spiculæ in a

*State Experiment Station, Baton Rouge.

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transparent sheath. Female 9cm. to 15cm. long; tail slightly spiral, and terminated by a papilla preceded by two others. Vulva situated near the anterior extremity. Ovoviviparous.

It appears that the presence of a worm in the interior of the eye of a horse, was reported for the first time in 1622, by Spigel. In 1773, a century and a half later, Domingo Rayo, a Spanish veterinarian, mentions a similar occurrence in a mule and a horse. In 1762, there was exhibited in Philadelphia a horse which had, it was reported, "a living serpent in its eye." A similar observation was made by Sick at Vienna in 1804. Since that date, the condition, Intra-Ocular Helminthiasis, has been observed on several occasions, both in this country and in Europe; although Prof. Williams, of Edinburgh, tells us that it is unknown in Great Britain. It would appear, so far as we can ascertain, that these *Filariæ* are most common in Bengal, Upper India, Madras, Ceylon, etc., and up to the borders of Burmah. They seem to be more frequent in certain localities than others, and are observed mostly during the cold season and when rain has been abundant.

Kennedy was the first to make mention of the condition in the eyes of horses in India, and more recently, details have been furnished by other observers, including Percivall, who, in 1825, stated that "in low, humid situations in India, where fogs are prevalent, or where there is stagnant water, especially after an unusually wet season, 'worm in the eye' is a very common occurrence. It is also seen in other parts during the cold months, from the beginning of October to the latter end of February. The symptoms seem to be conjunctivitis, the cornea obscured by 'nebulous effusion,' the eyelids closed and photophobia. On close inspection, a small white worm can be discerned floating in the aqueous humor, at one time rising to the superior, at another sinking to the bottom of the chamber." (The symptoms observed in our case, were, the presence of the nematode, actively swimming about in the aqueous humor, and opalescence of the cornea only).

Paszotta has observed that the eye-Filaria may die and be absorbed in five or six weeks.

Although ophthalmia due to *Filariæ* in the interior of the eye, has been most frequently observed in Equines and Bovines, some exceptional instances have been recorded as occurring in the Sheep, Dog, Chicken and Goose.

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It is claimed by some authorities, that the *Filaria papillosa* usually lives in the peritoneum of the horse, but Rudolphi has also found this parasite in the sub-peritoneal and inter-muscular connective tissue of the abdominal walls. Other observers have discovered it in the sub-arachnoideal space, in the substance of the diaphragm, as well as some other tissues of the body. In stagnant waters in India, both the parasites and their ova are said to be abundantly found, and that they find their way into the animals' bodies along with the drinking water, either in the fully developed state, or as ova.

As *Filaria papillosa* seems to have been discovered in such a variety of habitats, when found in the eye it may be looked upon as an "erratic" parasite, i. e., found in the adult state in an organ different from that which constitutes its usual haunt.

The course by which the *Filariæ* of the horse find their way to their final locality seems not to be definitely known. We should presume, however, that the blood-stream would be a most likely vehicle, especially for the conveyance of the ova to distant parts, they being, necessarily, extremely minute in size; and the development is completed in the ultimate location, as in the present instance, the anterior chamber of the eye.

The specimen which we have here to-night was observed by the owner of the horse, nine days previous to operation, to be about one-sixteenth of an inch in length. From its present size, it looks almost to have attained full development, being in the neighborhood of 50 mm. long, and from the spiral manner in which its tail is curved, as well as other characteristics, we believe it is a male parasite.

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IX.

THE GRASSES OF LOUISIANA.

R. S. COCKS.

(Communicated May 26, 1899).

In the catalogue ot Louisiana plants which was submitted to the Society last February, the grasses and sedges were omitted. This omission was rendered necessary for several reasons: Riddle, on whose catalogue I based mine, makes no mention of these groups, and I was unable to find any mention of them whatever except in the "Catalogue Provisoire" of Langlois of 1887. I had hoped that further search would bring to light some literature on the subject, but have finally been driven to the conclusion that none exists. It seems worth while, therefore, to present to the Society this preliminary catalogue. Though still, no doubt, far from complete, it represents a considerable advance (in size at all events) on the former list.

In preparing the catalogue I have examined most of the grasses in the Tulane Museum, which are supposed to comprise the collections of Hale, Carpenter, Riddell, Joor and one or two others, and I have collected a large majority of the species enumerated, principally in the parishes of Orleans, St. Tammany, Tangipahoa and in North Louisiana.

The arrangement and nomenclature follows that of Prof. Beale's "Grasses of North America."

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PRELIMINARY CATALOGUE OF THE GRASSES OF LOUISIANA.

Tribe I. MAYDEÆ.

Tripsacum dactyloides L.
Coix lachryma L.

Tribe II. ANDROPOGONEÆ.

Erianthus brevibarbis Michx.
compactus Nash.
saccharoides Michx
alopecuroides (L.) Ell.
strictus Baldwin.
Andropogon tener Kunth.
scoparius Michx.
argyraeus Schult.
Mohrii Hack.
Elliottii Chap.
Virginicus L.
macrourus Michx.
provincialis Lam.
Sorghum halepense L.
Chrysopogon avenaceus Michx.
nutans (L.) Benth.
Hackelochloa granularis L.
Manisurus corrugata (Baldw.) Kuntze.
cylindrica (Michx.) Kuntze.
rugosa (Chapm.) Kuntze.

Tribe III. ZOYSIÆ.

(Not represented).

Tribe IV. TRISTEGINEÆ.

(Not represented).

Tribe V. PANICEÆ.

Paspalum compressum (Swartz.) Nees.
paspaloides (Michx.) Scribn.
mucronatum Muhl.
virgatum var. **pubiflorum** Vasey.
conjugatum Berg.
ciliati folium Michx.
plicatulum Michx.

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difforme Le Conte.
dilatatum Poir.
var. **decumbens** Vasey.
boscianum Flugge.
distichum L.
elatum Rich.
praecox Walt.
laeve Michx.
vaginatum Sw.
Floridanum Michx.
setaceum Michx.
membranaceum Walt.
Anthaenantia rufa Benth.
villosa Beauv.
Panicum sanguinale L.
filiforme L.
serotinum (Walt.) Trin.
lineare Krok.
prostratum Lam.
angusti folium Ell.
colonum L.
cognatum Schultz.
Crus-galli L.
var. **hispidum.**
brachyanthum Steud.
consanguineum Kunth.
gymnocarpon Ell.
depauperatum Muhl.
virgatum L.
digitarioides Carpenter.
amarum L.
erecti folium Nash.
milliaceum L.
stenodes Gris.
manatense Nash.
gibbum Ell.
neuranthum Griseb.
melicarium Michx.
paspaloides Pursh.
repens L.
var. **confertum** Vasey.
anceps Michx.
platyphyllum Munro.
agrostoides Muhl.
Porterianum Nash.
proliferum var. **geniculatum** Vasey.
scopharium Lam.
capillare L.
Walteri Pursh.
subspicatum Vasey.
verrucosum Muhl.

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microparpon Muhl.
var. **sphaerocarpon** Ell.
dichotomum L.
barbulatum Michx.
villosum Ell.
nitidum Lam.
laxiflorum Lam.
commutatum Schult.
Joorii Vasey.
Walteri var. **molle** Vasey.

Oplismenus setarius R. & S.

Chamæraphis (Setaria) magna Griseb.
italica [L.] Kuntze.
viridis (L.) Scrib.
glauca [L.] Kuntze.
verticillata [L.] Porter.

Cenchrus myosuroides H. B. K.
macrocephalus Scrib.
tribuloides L.

Stenotaphrum secundatum [Walt] Kuntze.

Tribe VI. ORYZEÆ.

Hydrochloa Carolinensis Beauv.

Luziola Peruviana J. F. Gmel.
Alabamensis Chap.

Zizania aquatica L.

Zizaniopsis miliacea Michx.

Homalocenchrus Virginicus Britt.
oryzoides (L.) Meig.
lenticularis [Michx.] Kuntze.
hexandra [R. & S.] Britt.

Tribe VII. PHALARIDEÆ.

Phalaris intermedia Bosc.
var. **angusta** Chap.
canariensis L.

Tribe VIII. AGROSTIDEÆ.

Aristida purpurascens Poir.
dichotoma Michx.
oligantha Mx.
gracilis Ell.
lanata Poir.
stricta Michx.

Muhlenbergia Schreberi Gmel.
capillaris (Lam.) Trin.
capillaris var. **trichopodes** Kth.

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Brachelytrum erectum Schreb.
Phleum pratense L.
Alopecurus geniculatus L.
Sporobolus asper (Michx.) Kunth.
argutus (Nees) Kunth.
junceus (Michx.) Kunth.
Indicus R. Br.
Polypogon monspeliensis (L.) Desv.
littoralis Sw.
maritimus Willd.
Thurberia Arkansana (Joor) Benth.
Cinna arundinacea L.
Agrostis perennaus Walt.
verticillata Vill.
hyemalis Walt.
exarata Trin.

Tribe IX. AVENÆ.

Holcus lanatus L.
Trisetum palustre Joor.
Ludovicianum Vasey.
Avena sativa L.
fatua L.
Arrenatherum elatior (L.) Beauv.
Danthonia spicata R. & S. (Collected in Alexandria by Hale).

Tribe X. CHLORIDEÆ.

Capriola dactylon (L.) Kuntze.
Spartina gracilis Trin.
polystachya Willd.
juncea Willd.
stricta var. **glabra** Gray.
Campulosus aromaticus Scrib.
Chloris Swartziana Doell.
Gymnopogon brevifolius Trin.
racemosus Beauv.
Bouteloua hirta Lag.
racemosa Scrib. & Vasey.
Eleusine Indica Gaert.
Ægyptiaca Pers.
Leptochloa scabra Nees.
mucronata Kth.
fascicularis Gray.

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Tribe XI. FESTUCEÆ.

Phragmites communis Trin.

Sieglingia stricta (Nutt) Kuntze.

ambigua [Ell.] Kuntze.
Americana Beauv.
Texana [Thurb.] Kuntze.
sesleroides Benth.

Eragrostis hypnoides [Lam.] B. S. P.

glomerata Walt.
ciliaris [L.] Link.
capillaris [L.] Nees.
frankii Meyer.
major Host.
Purshii Schrad.
pilosa L.
secundiflora Presl.
refracta [Muhl.] Scrib.
pectinacea Gray.
oxylepis Torr.

Eatonia obtusata Gray.

Pennsylvanica Gray.

Koeleria cristata (L.) Pers.

Melica mutica Walt.

Uniola gracilis Michx.

latifolia Michx.
nitida Baldw.
paniculata L.

Distichlis maritima Raf.

Dactylis glomerata L.

Poa annua L.

arachnifera Torr.
trivialis L.
pratensis L.
sylvestris A. Gray.
compressa L.
flexuosa Muhl. (?)

Panicularia fluitans R. Br.

Festuca myuros L.

rigida Kth.
nutans Spreng.
elatior L.
octoflora Walt.

Bromus racemosus L.

secalinus L.
unioloides Willd.

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Tribe XII. HORDEÆ.

Lolium temulentum L.
perenne L.
Hordeum pratense Hads.
vulgare.
Elymus Canadensis L.
striatus Willd.

Tribe XIII. BAMBUSEÆ.

Arundinaria macrosperma Michx.
var. **tecta** Walt.

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X.

TURNING POINTS IN THE SPRING MIGRATION OF 1899.

H. H. KOPMAN.

(Communicated May 26, 1899).

There are each spring, under normal conditions, several well defined periods of migration. As the species and individuals of birds are dispersed from the tropical and sub-tropical regions northward, we can readily distinguish times at which the flow of migration wells up into what is now popularly and technically known as a "bird wave." These waves doubtless pass our latitude with even greater regularity than we might suppose from observations each year, for the passing of the wave is determined by the conditions of the weather over a much larger region than any one could observe directly, while the matter of the stoppage of the birds in the exact latitude and locality of the observer is dependent upon the state of the atmosphere in that locality and latitude. However, experience gained during several seasons will enable one to find the normal migration periods by striking an average. The variations cannot be predicted, though they will not be great unless the disturbing causes are very great.

There is no marked period of migration in the latitude of New Orleans (unless the ducks and snipe be excepted) before the end of February; the only small bird to arrive previous to that time being the Martin, but the coming of this species is so irregular, and takes place after such a straggling manner, that no general movement seems to agree with the records telling of its return.

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The first two weeks in March are busy times among the birds, and most species that arrive here before the days immediately following the calendular equinox come in those two weeks, so that, with the exception of the arrival of two or three species, there is a lull from March 15th until the 22d or 23d. From then until April 10th, the proportions of the migratory movements constantly grow; after that the bird supply depends mostly on the amount of rainy weather. In dry springs few migrants will be seen later than the middle of April, but with a fair amount of moisture and bright weather intermingled there is always an indication (often very substantial] of a passing wave about April 20-25. With heavy thunder showers and brisk days following, the very last days of the month may be notable for the presence of many species, which abundance may continue for a few days in May.

The object of these notes is to show how far these periods were affected by the extraordinary weather of last February. Considering the temperatures prevalent during the first eighteen days of that month, migration, at least, may be taken as having been precluded during that time, and while the weather after that was sufficiently mild for several species to come, the battered condition of the woods, and the desolate appearance of nearly all growing things were insuperable objections to the northward movements of the smaller insectivorous species of spring and summer. Despite the good efforts of the all-conquering vernal energy of this latitude, the woods were slow in getting into shape for anything but the winter birds, and it was March 13th before any noticeable migratory movements could be detected. Then and the following day white-bellied Swallows came, Martins increased and two or three other species arrived. It is doubtful whether the birds were ever so much retarded in their migration as this spring. However, after the migration started it went on more as it is wont, and the later lay the time of arrival of a species the nearer was its arrival to the normal, so that after April 8th or 10th no late arrivals were recorded, but the transient Brown Thrushes were late in getting away, many still being present on April 13th; ordinarily the bulk of these birds move through at least five or six days earlier.

But in March two species, whose time of arrival should be rather in the first migratory period, did not come until the second. These were the Chimney Swift and the Gnatcatcher

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both of them appearing with the Orchard Oriole, a species that usually follows them by a week. March 25th and 26th appeared to be days of unusual activity, but a strong north wind broke into the favorable weather, and although April 3d was a rainy, mellow day, on which the Summer Warblers and, no doubt, many Kentucky Warblers, arrived, more cold weather between then and the 10th interfered with the course of the migration, deferring, so far as could be made out, the arrival of many birds to April 9-11.

By the 13th of April summer temperature and appearances prevailed, and the season seemed to be going to the other extreme of ending very early. However, on April 20th and 21st showers came and many late migrants were present as Bank Swallows, Black-throated Buntings, Worm-eating Warblers, Yellow-billed Cuckoos, the Olive-backed Thrush, Blackburn's Warbler, Blue-winged Warblers, Summer Warblers and the last of the Myrtle Warblers and White-throated Sparrows. After this the season presented no peculiar features; the only items of interest being the gradual disappearance of such winter residents as leave here very late—the Pipit, the Savanna Sparrow and the Rusty Grackle.

Summer seemed to be well installed by May 8th.

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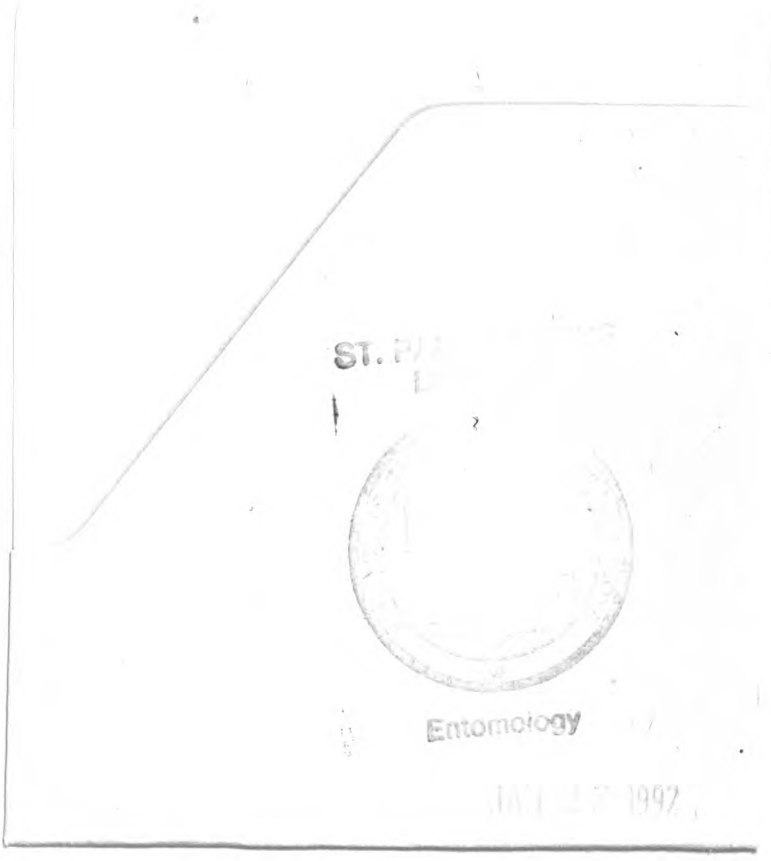

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